OCTOBER 1961

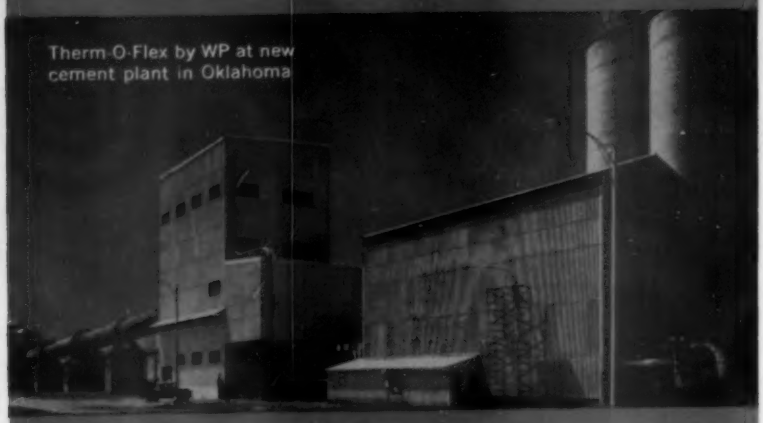
ROCK PRODUCTS

Service through Research: The NCSA Lab

page 80

Diversification leads to extra profits

page 86



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An inquiry—on your business letterhead—will bring you literature promptly. Just write Western Precipitation, 1000 W. 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)

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River of rocks flows over river of water

Aggregate for Ice Harbor Dam project delivered by B.F.Goodrich belt

WHAT do you do when the dam you're building is on one side of a river, the aggregate you need is on the other?

Engineers on the Ice Harbor Dam project built a "belt-bridge" to span the 920-foot width of the Snake River. A single conveyor belt moves the rock, sand, gravel across the bridge, then takes it another 270 feet on up to the batching plant.

B.F.Goodrich men, working with the contractor, recommended that the rubber belt be made with BFG Nyfil fabric. Nylon used for cross threads in the fabric adds extra strength to the belt so it can stand wear and tear that causes other belts to break down.

According to the engineers, the B.F.Goodrich belt is doing an excellent job of carrying the 660-ton-per-hour loads of jagged rock. After hauling the 1¼ million tons on this job, it'll probably be moved to another construction site for more years of service.

Your B.F.Goodrich distributor has full information about this Nyfil belt. And, as a factory-trained specialist in rubber products, he can answer your questions about any of the rubber products BFG makes for construction work. *B.F.Goodrich Industrial Products Co., Dept. M-200, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

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October 1961

In this issue

80 The NCSA Laboratory: Service through Research
by JOSEPH N. BELL

85 How to pick a maintenance man
by ERNEST W. FAIR

86 Diversification leads to extra profits
by JOHN H. BERGSTROM

90 Aggregates processing tips, *Part 2:* Scrub, wash & size
by C. E. GOLSON & D. E. NEWTON

94 Aggregates production at dams, *Part 3:* Aggregate, power records sent tumbling at Grand Coulee
by WALTER B. LENHART

97 Welding shops can help cut your hardfacing budget, *Part 2*

100 Scrubbers whip limerock matrix
by ELWOOD MESCHTER

108 NSGA board meeting highlights current work on . . . taxation, public relations & engineering

112 Controllers exchange know-how on financial practices

116 Belt conveyor system masters terrain

120 Do you add phosphates to your slurries?
by W. B. CHESS, D. N. BERNHART & R. GATES

Departments

72 Calendar
20 Editorial
76 Hints & Helps
50 Industry News
36 Labor Relations
150 Manufacturers News
136 New Literature
145 New Machinery
142 New Patents
164 Notes from the Publisher
42 People in the News
24 Rocky's Notes
134 Truck Talk
29 Washington Letter
13 What's Happening

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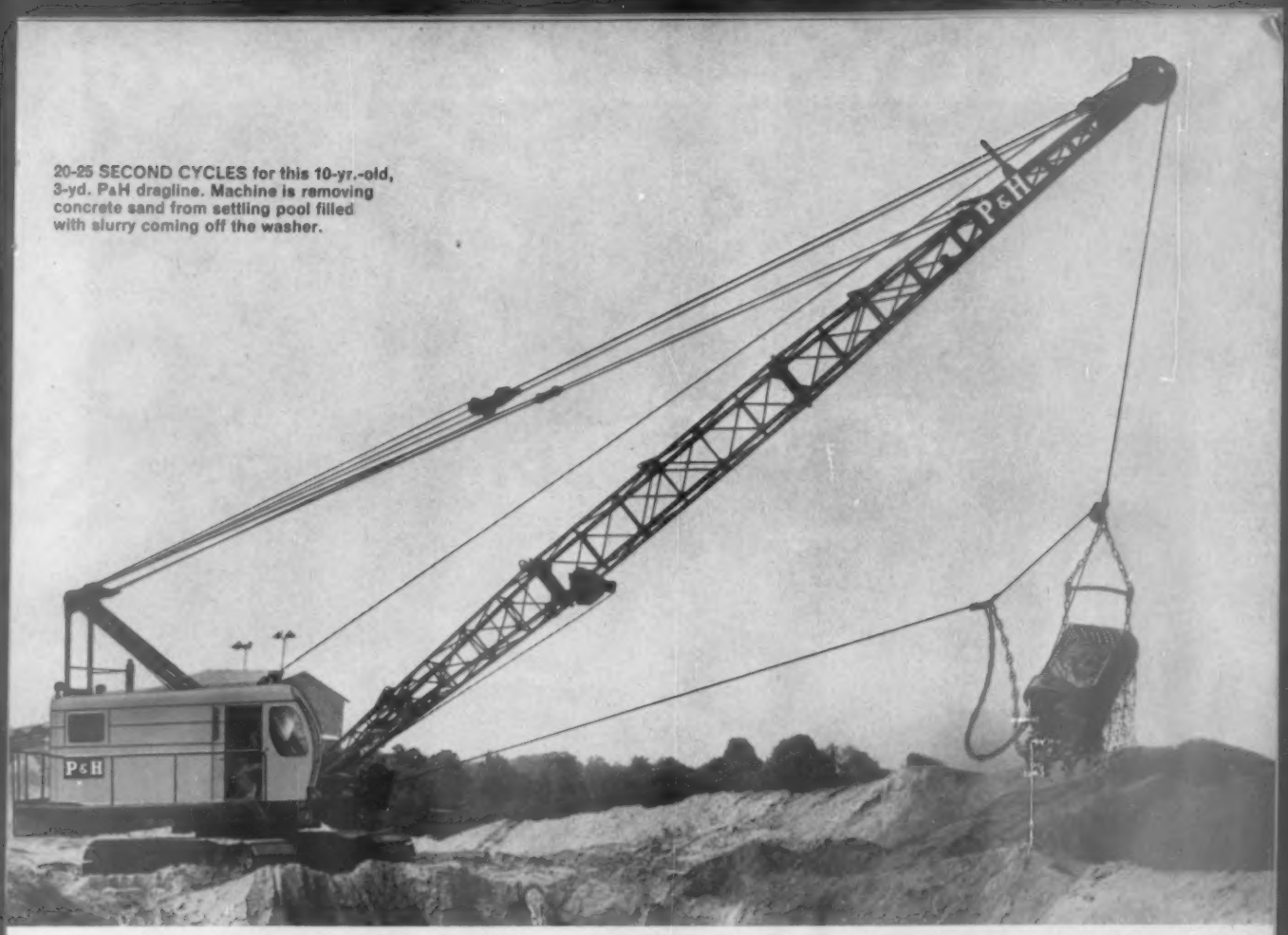

20-25 SECOND CYCLES for this 10-yr.-old, 3-yd. P&H dragline. Machine is removing concrete sand from settling pool filled with slurry coming off the washer.

"now in tenth year, Magnetorque equipped P&H 955A dragline is still the biggest producer around"

...REPORTS COMMONWEALTH SAND & GRAVEL CORP., RICHMOND, VA.

"In Spring of '52, we bought one of the first 3-yd P&H 955A Draglines equipped with Magnetorque Swingers. In '55 we bought two more," says John Twohy, II President. "We had rigs with friction swings and compressed air swings. They couldn't compare with our P&H draglines." Proof again that one P&H always sells another.

3960 TONS DAILY OUTPUT for two 3-yd. P&H draglines digging in gravel pit. These machines work from 30-ft. high bank, dig 10 to 12 ft. below water surface.

"We believe Magnetorque Swingers will practically double the life of our machines". . . says Twohy. "Magnetorque Swingers have made our P&H draglines exceptionally fast and dependable . . . eliminated the need for constant adjustment and downtime for lining replacements. What's more," he points out, "Magnetorque Swingers minimize wear and tear on the crawlers because their smooth, jerkless swings reduce the walking effect you'd ordinarily get on a setup like ours."

Heavy-Duty P&H Booms pay off . . . "P&H design engineers understand that people in our type of dragline work need a heavy-duty boom—and they've provided it," continues Twohy. "Ordinary booms just don't stand up."

To see how P&H machines can pay off for you, contact your P&H dealer. He'll be pleased to arrange for a demonstration at your convenience. For more details on this job, ask him for Case History No. 151 or write us.

HARNISCHFEGER P&H
Milwaukee 46, Wisconsin

51-376

CORHART 104 is the *one* refractory engineered to eliminate costly hot spots in cement kiln hot zones. The tight, interlocking structure of Corhart 104 resists spalling, corrosion, and chemical attack far longer than conventional bonded basic refractories. It attracts and tenaciously clings to a good clinker coating. Modest amounts of Corhart 104 in severe wear areas result in *balanced refractory life* throughout the hot zone, and lower overall refractory cost per ton of clinker. Write for more information: Corhart Refractories Company, Inc., 944 Commonwealth Bldg., Louisville 2, Kentucky.

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NORTHWESTS POUR IT ON IN THIS PIT!

PICKITT & SCHREUR
Allegan, Michigan
buy their 35th
NORTHWEST

This is one of the pits of Pickitt & Schreur, one of Michigan's best known material producers. Here are two of the five Northwests used in their pits near Plainfield, Mich. These Northwest Model 41's really "pour it on" to get the material out. One plant feeds straight to the trucks.

A new Northwest Model 6 just added to the Pickitt & Schreur fleet makes 35 Northwests this Michigan material producer has bought — *thirty four* repeat orders that can only demonstrate unqualified user satisfaction.

Whether your problem is a dragline operation, like this, a clamshell job with a bin setup or a hard rock quarry that calls for a shovel, Northwest advantages make Northwest your best investment.

You have a range of crawler widths and lengths with either Block & Skid or Differential Steering. Quickly removable Counterweight cuts the load when operating different pits. Smooth, easy operating Uniform Pressure Swing Clutches bring accuracy to spotting a load to truck or grizzly. The Feather-Touch Clutch Control gives the "feel" of the load to a degree impossible with any air or hydraulic control. There is a wide range of crane advantages. Torque Converters are available, and in shovel work the Northwest Dual Independent Crowd utilizes force most independent crowd shovels waste—the most powerful digging tool available. Ask about these advantages.

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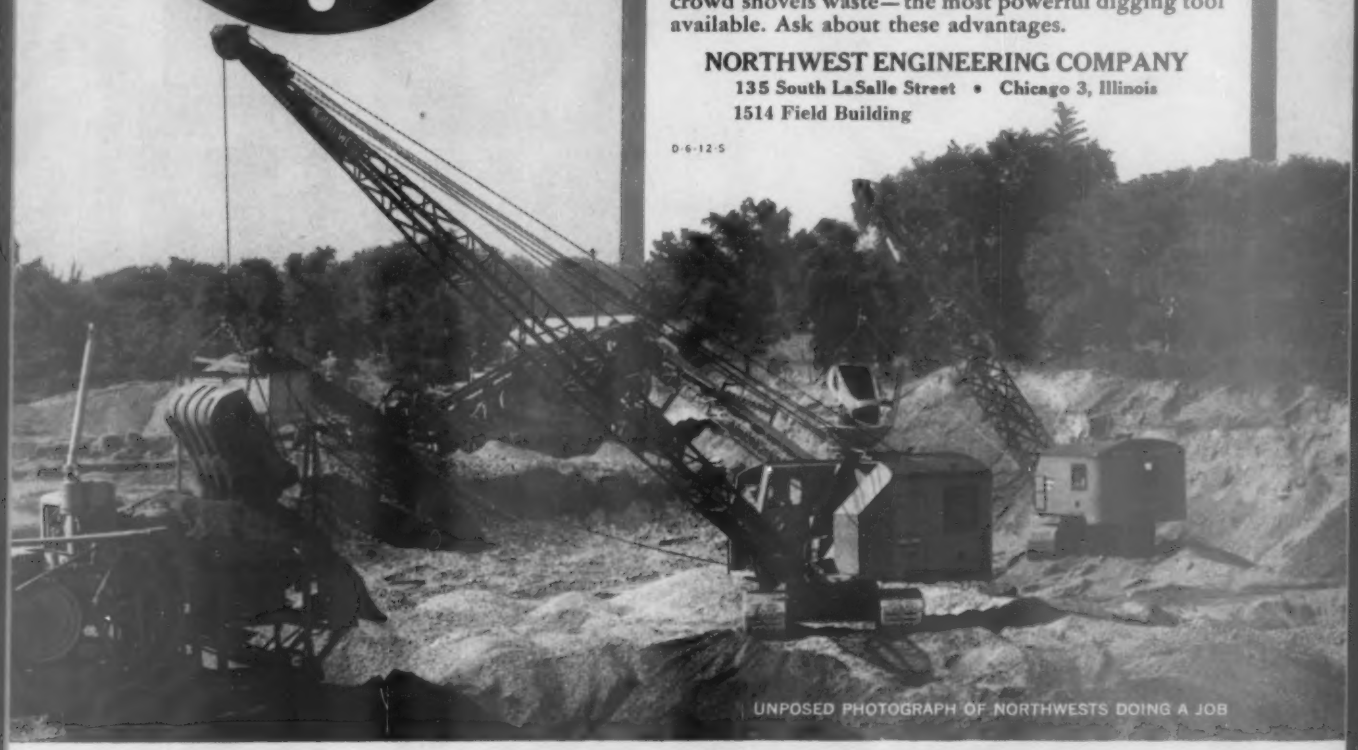


UNPOSED PHOTOGRAPH OF NORTHWESTS DOING A JOB

You can say... "THEY'RE ALWAYS READY TO GO!"

3/4 to 3
Cubic Yard Capacity

NORTHWEST

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity

PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	25-Ton and 45-Ton Capacity

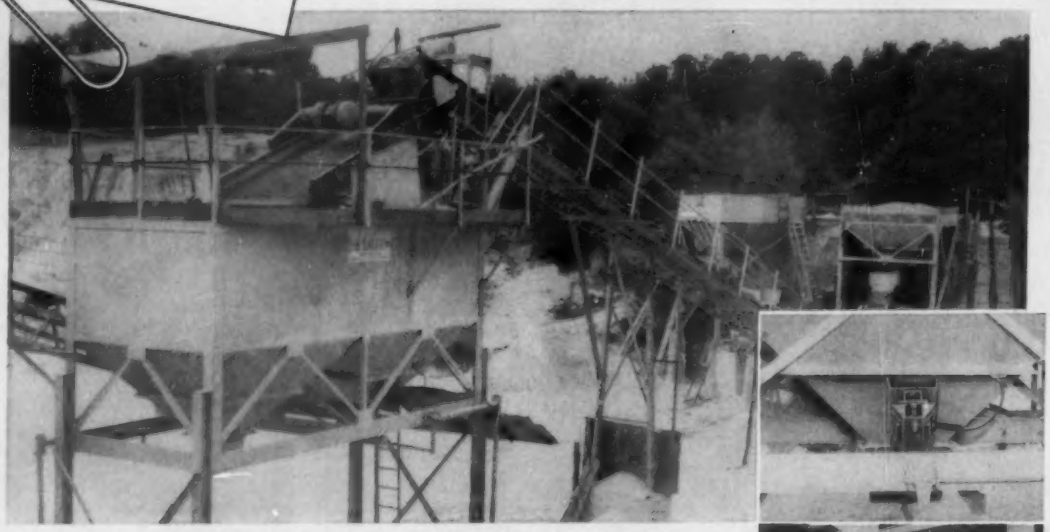
SYNTRON

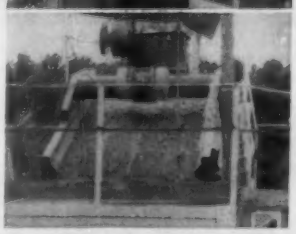
CASE HISTORY

another successful application in the

No. 1443

SAND and GRAVEL INDUSTRY





C & L Goodhart — Masonry Sand Producers

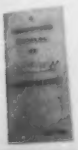
get excellent results in every production phase with a

SYNTRON VIBRATOR, FEEDER, GRIZZLY, SCREEN

One of the finest masonry sand producing plants in Central Pennsylvania is owned and operated by C & L Goodhart at Walnut Bottom, Pennsylvania. This plant was designed and built by L. B. Smith, Inc., Camp Hill, Pennsylvania and has been in operation since April, 1959.

This plant has an output of approximately 100 tons of high grade masonry sand per hour, with 60 tons produced by the primary crusher circuit and 30 to 40 tons from the secondary hammermill circuit. The process equipment that has helped this plant maintain high production standards and a quality product include—a Model RVS-1510 Rotary Vibrator Screen, a Model F-55DT Vibrating Grizzly, a Model F-33DT Vibratory Feeder, and a Model V-75 Electric Vibrator. All Syntron Equipment.

Syntron equipment has successfully aided C & L Goodhart with materials handling problems—it can do the same for you.



For detailed information write for a free Syntron Catalog today.

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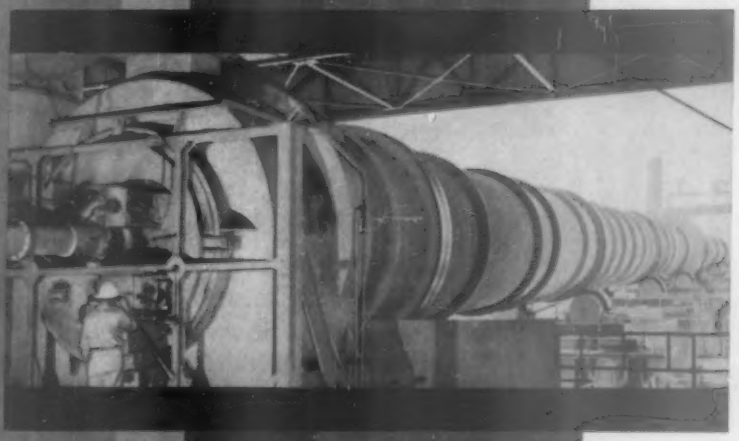

Why this 1933 first welded kiln could be the key to your company's profits in the 60's

For the simple well-proved reason that they're better, kilns of all-welded construction are pretty much "standard" today. Important to keep in mind: the standard was set by Traylor . . . builder of the first welded kiln in 1933.

A radical innovation a generation ago —but why so important now? First and obviously, it means that Traylor has the longest record of experience in this special kind of equipment.

More important still: It's merely one example of Traylor's coming up first with new ideas to meet changing needs. Benefits of other Traylor "firsts"—some dating before 1933, many since—are being reaped today throughout the industry, quite likely already including your own plant. Traylor built, for example, the first 60-inch primary gyratory crusher and the first large ball mill.

Today Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced by expanded research capabilities and process know-how.

Up-to-date facilities and a long, impressive record of past "firsts" are a good combination of reasons to call on Traylor first when you're planning for efficient operation in the changing business climate of the sixties.

"See Pit & Quarry Handbook for details and specifications"

Traylor

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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GARDNER-DENVER'S NEW ROTA-SCREW PORTABLES ARE TAKING OVER FROM COAST TO COAST

Gardner-Denver Rota-Screw compressor capacities: 900, 600, 125 cfm. For full details, write for Bulletin SP-1.

IN THE ROCKIES: New SP600 Rota-Screw portables and swing-boom "Air-Trac" drill building access road to Round Butte Dam site near Madria, Oregon.

EAST COAST: Battery of SP600 Rota-Screw portables and swing boom "Air-Trac"® drills on super highway in Virginia.

MIDWEST: A new Gardner-Denver SP600 Rota-Screw portable powering "Air-Trac" drill in an Indiana stone quarry.

1. NO WEARING PARTS IN COMPRESSION CHAMBER
2. INSTANT COMPRESSED AIR. AUTOMATIC BLOWDOWN
3. AVAILABLE NOW IN THE SIZES YOU NEED

WEST COAST: SP600 Rota-Screw portable teams up with a swing boom "Air-Trac" drill on access road to logging camp near Portland, Oregon. There's a new Rota-Screw portable operating in your area, too! Write for more information.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois—Offices in principal U.S., Canadian and Mexican cities
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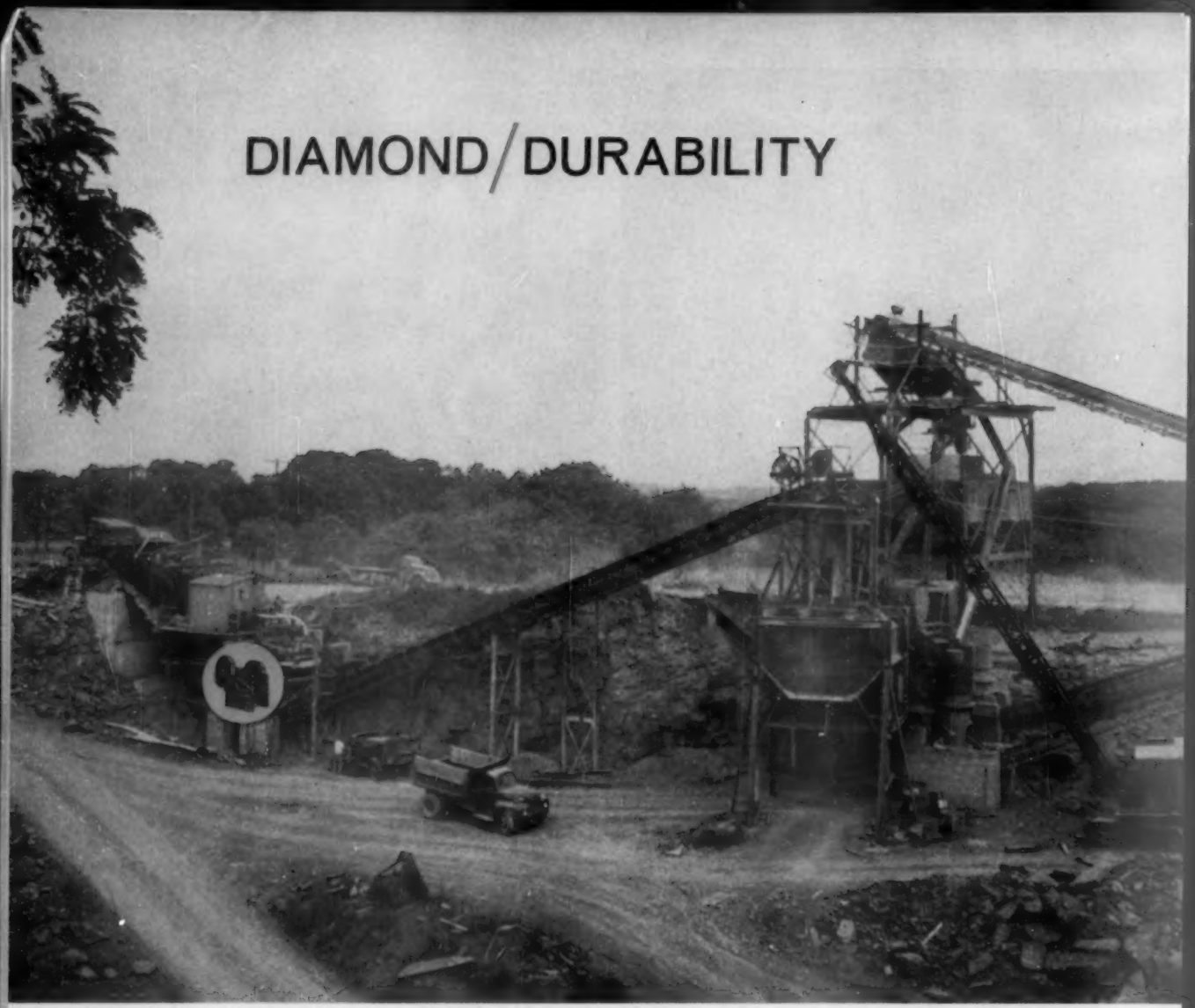
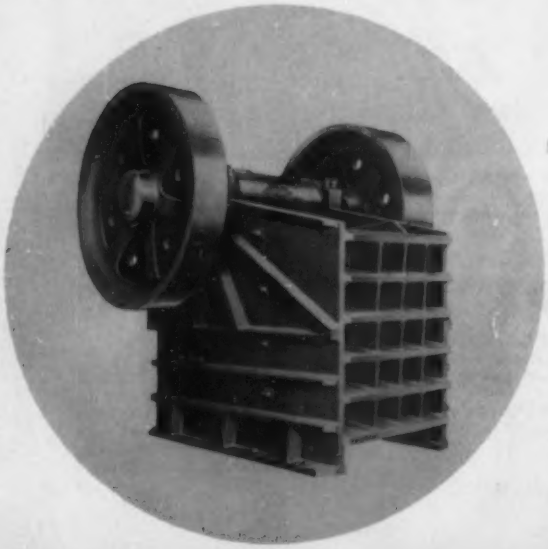


More than a million tons of rock crushed .



Yes that's right! More than a million tons of hard rock have been crushed by the Diamond 36 x 48 jaw crusher circled above—and maintenance and repairs have totalled *under seven/one-hundredths of a cent per ton* (not counting lubricants)!

"Not one of our other makes of crushers can compare with the Diamond for trouble-free operation" says Mr.

Diamond makes jaw crushers in 12 sizes; from 6 x 12 to 44 x 48, with capacities ranging from 1½ to 700 tons per hour.

. at less than $0.0007 per ton maintenance

Joe Gloster, president of the owner company, Spring House Quarry, suburban Philadelphia.

Diamond jaw crushers are built to handle hard rock . . . provide uniform sizes . . . and produce the tonnage per square foot of jaw area that makes for a profitable investment. See your Diamond distributor for complete information on any one of the 12 sizes now available.

Mr. Joe Gloster
President
Spring House Quarry

DIAMOND

DIAMOND IRON WORKS

DIVISION

GOODMAN MANUFACTURING COMPANY

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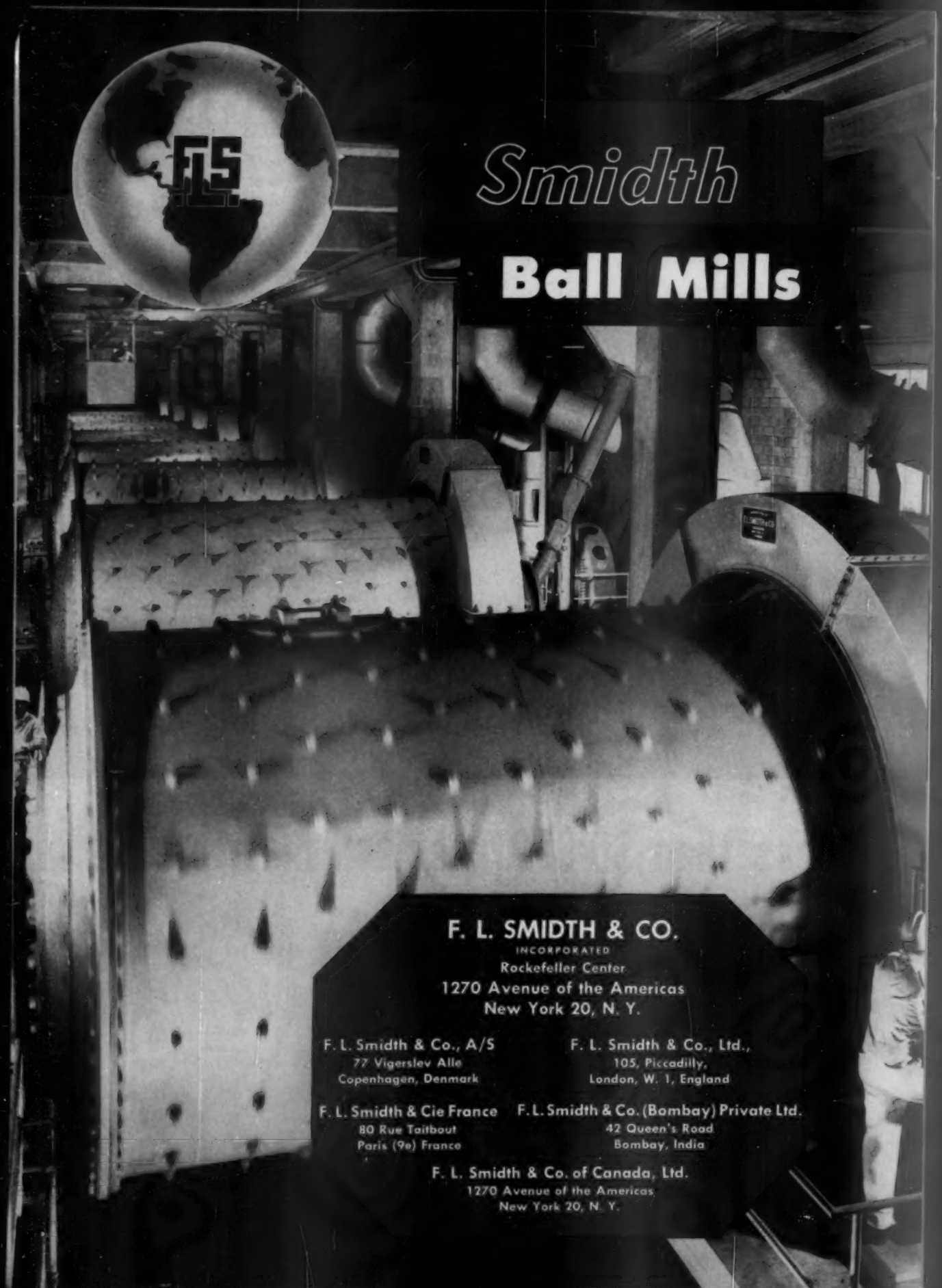
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WHAT'S HAPPENING

in other fields of interest to the rock products industry

Even before the ancient Greeks, men were trying to take water from the ocean and make it usable, realizing that water is our most precious resource and its lack is completely paralyzing. Now Fairbanks Whitney Corp. in partnership with the State of Israel has developed a relatively simple process which can de-salt at a cost below $1 per 1,000 gal. with capacity of 1 million gpd. Based on the vacuum freezing method created by Israeli scientist Alexander Zarchin, the equipment consists of a hydro-converter (which converts sea water into vapor, ice and concentrated brine) and a counter-washer (which cleanses the brine from the ice and directs the pure ice into a melting chamber to turn into pure water). The by-product brine is valuable to the chemical industry. Zarchin's method is unique in the simplicity of the machinery; the process is continuous and kept in a state of substantial thermal balance. Unlike other setups, which cannot operate at a cost below $1.75 per 1,000 gal., this process uses no chemicals or electrolysis processing, and needs a minimum of power. The Fairbanks Morse plant at Beloit, Wis., is being readied for mass production of the new de-salting units. The first are going to Israel's Elath plant on the Gulf of Aqaba.

A technicolor yield of marble, twenty colors including rare black blends, was accidentally discovered on a uranium search in southwest Utah. And a new company—Western Marble, a Division of United Technical Industries—is mining this rare find on 4,300 acres, with a finishing plant scheduled for completion next year. Eventually production is expected to reach 120 tpd. Architects should find these quarries an abundant supply of decorative marbles, which at present must be imported from Italy.

Sand and gravel help fend off "background" radiation for atomic research laboratories, thanks to the 1959 discovery of a particularly neutral deposit at Port Elizabeth, N.J. The special mix concrete being used at the Bartol Research Foundation's new Springfield, Pa., laboratory cuts down the interfering rays to one-sixth the original, making possible delicate measuring and recording experiments that could not otherwise be performed. Too, at $30 per cu. yd., it costs far less than more commonly used atomic shielding materials such as lead.

Sometimes flying 'round the clock, Keva III, the jet-prop "wings" of Ideal Cement Co., whizzes the company's top officials to one important meeting or plant site after another at 300 mph. The F-27, with its 3-man crew, is the third and most deluxe member of a line of Ideal aircraft started in 1945. That year former President Claude K. Boettcher "donated" the twin-engined Beechcraft Keva I and the services of first pilot Forest Conover in spite of Ideal's lack of enthusiasm. However, they soon proved their worth—to the extent that in 1947 a DC-3 was purchased. True to its kind, the Keva II gave 12 years of honorable service until the present plane flew on the scene.

Please turn page

The Army is rolling out the barrels—but they contain buildings, not beer. Liquid plastic at a density of about 60 lb. per cu. ft. is shipped to the construction site. There the chemicals are mixed to form a rigid plastic foam with a density of 2 cu. ft.—meaning that you get 30 cu. ft. of building material for each cu. ft. of the raw liquid. At Ft. Belvoir, Va., the Army Corps of Engineers has produced a building 11 ft. wide, 24 ft. long and 9 ft. high. The entire 552-lb. structure was "poured" from a 55-gal. barrel.

One of the "industrial wonders of the world" has rebelled, forcing a costly shutdown and a $2 million repair project. The mountain-housed power generating system which backs up the production of 20 percent of Canada's aluminum—at the Aluminum Co. of Canada, Ltd., Kitimat smelter—came to a crashing halt. Fifty miles south of Kitimat, near Kemano, B.C., a 10-mile tunnel through Mt. DuBose carries water from a 358-sq. mi. reservoir to five generating turbines in a mountain cavern. Almost a year ago, granite boulders began breaking loose inside the tunnel, blocking the water flow so badly that a shutdown at the smelter, idling 1,400 men, took place. A large crew has been occupied with the difficult task of clearing and repairing both tunnel and cavern—sometimes 24 hours a day.

Unlucky space travelers may be shot by micrometeorites—bullet-like extraterrestrial dust particles traveling at speeds over 170,000 mph. At the Air Force's Cambridge, Mass., laboratories, scientists are analyzing the payload, collected outside the earth's atmosphere, of an Aerobee-Hi rocket fired over the New Mexico desert. Their aim: to discover methods of detecting this potential danger from the ground.

A grapefruit-sized magnet at Massachusetts Institute of Technology has set up the largest continuous magnetic field ever created by man. Built by Dr. Henry H. Kolm, the magnet's field is rated at 126,000 gauss (the unit of measurement of magnetic intensity). Physicists at MIT's National Magnet Laboratory will use it to get a closer look at the energy levels and specific frequency characteristics of various materials.

The answer to automation for portland cement manufacture and other industrial chemical processes may be found in radioactive isotopes. According to Industrial & Engineering Chemistry (August 1961, p. 17A), Battelle Memorial Institute is working on a method in which intrinsic radiotracer techniques add small amounts of radioactive isotopes of the same chemicals which are being processed. Changes in composition can then be monitored by measuring radioactivity levels in various streams.

Many U. S. lakes are being choked to death by weeds—which in turn are getting greater and greater stimulus from commercial fertilizers and pollution. But an inventive Lansing, Mich., resident built a do-it-yourself pontoon boat and started investigating the possibilities of cutting weeds with it. Finding that this was no permanent solution, he searched for a portable dredge that would lower the cost—prohibitive to small lakes. Out of this, the Waterways Control & Development Corp. was born. Armed with a 47-ton dredge, which can be dismantled and carried on two trucks, the company is starting out to suck the peat and silt from the area's lakes.

GOODYEAR

Q: What do Goodyear Earthmover Rims have that no others have?

A: MORE times FOUR

1. MORE rims on the job: More tons are hauled on—more earth-moving equipment rides on Goodyear rims than on any other kind. Result: You reap the benefits of the widest, soundest experience in rim design, manufacture and use.

2. MORE kinds of rims: Maximum rim performance stems from proper specification. Goodyear makes the *only complete line* of earthmover rims. Result: The choice that permits you to get exactly the right rim for the job.

3. MORE rim engineering help: Goodyear has more engineers designing *and selling* rims than any other company. And they know tires, too. Result: The help you need in choosing the right rim for top performance—longer tire life.

4. MORE rim "firsts": The first *true* earthmover rim, the first 5° rim, the first tubeless rim—in fact, every major earthmover rim advance was made by Goodyear. Result: The very latest in rim design and manufacture at work, for you.

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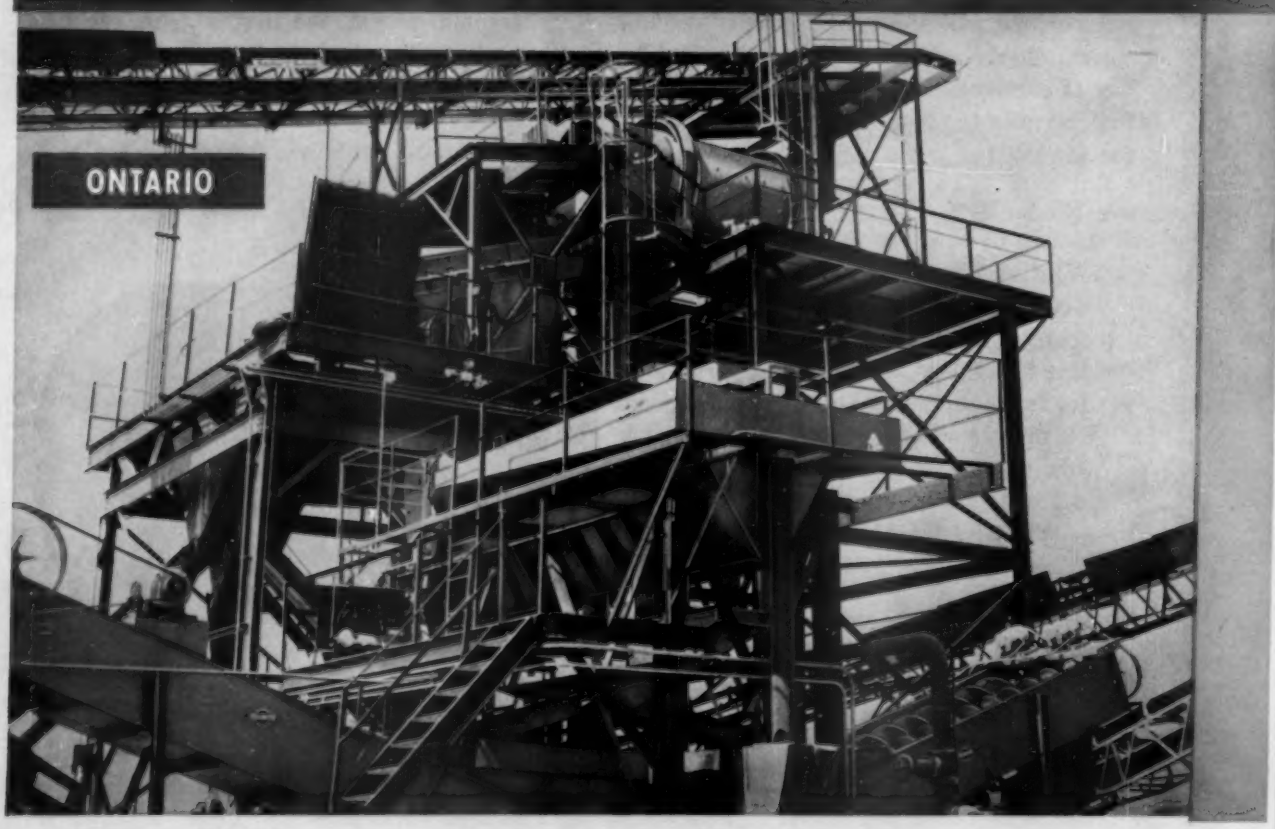

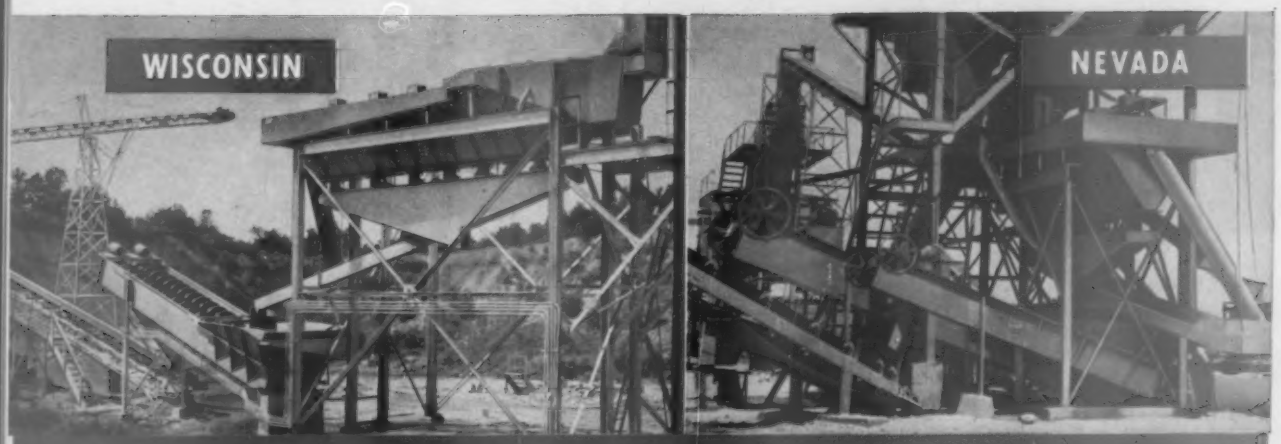

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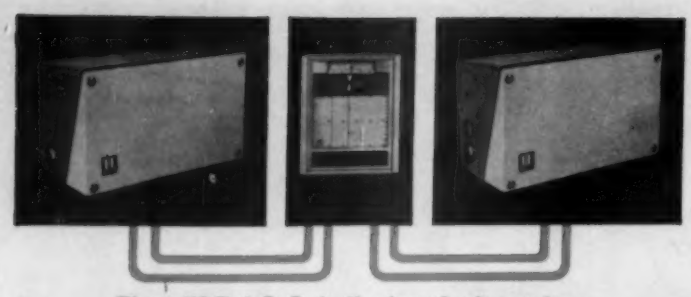

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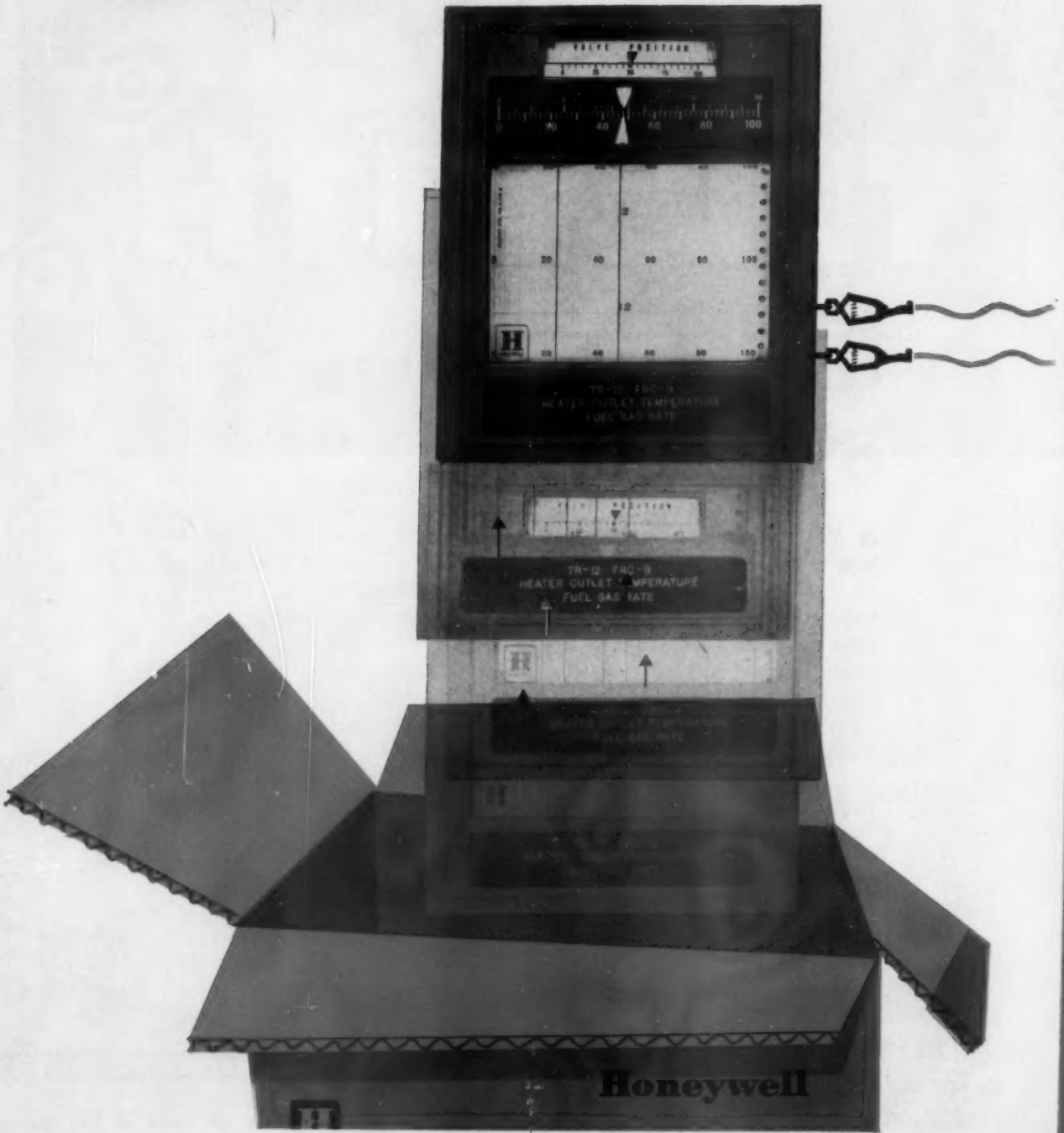

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EDITORIAL

by George C. Lindsay

Safety by legislation?

WASHINGTON APPARENTLY BELIEVES that the rock products industries, and metal mines, are too lax with safety, and has proposed a 2-year study of the "problem" area to get the facts. To some, implication of the proposed study means that metal and non-metal mines eventually will be subject to a federal mine inspection law. Coal and lignite mines have been operating under such a law since 1941.

The proposed bill—HR 8341, by Rep. O'Hara of Michigan—was introduced to the House during July and referred to the Committee on Education & Labor. That committee reported out the bill August 18 without amendment.

The bill authorizes the Secretary of the Interior to conduct the study. He will, if the bill passes, look into the causes of injuries and health hazards of the industries covered. He'll study the effectiveness of health and safety education, and will study state mine-safety laws as to their scope, adequacy and enforcement. The relative effectiveness of voluntary versus mandatory reporting of accident statistics is another area he'll cover.

The tip-off as to the possible attitude of Congress on the exercise of control over the industries, safetywise, is included in two areas the Interior Secretary will be authorized to study. One concerns "the relative contribution to safety of inspection programs embodying (a) right-of-entry only and (b) right-of-entry plus enforcement authority." The other deals with "the magnitude of effort and costs of each of these possible phases of an effective safety program" for mines other than coal and lignite.

Can improved safety experience be obtained through control provided by federal legislation? If it can, wouldn't the imposition of such enforcement on our industries be an indictment against management, whose normal function it is to prepare and implement good safety programs? If it can't, why is the federal government studying the possibility of inflicting on our industries a safety inspection program with teeth in it? We can only assume that Congress is not satisfied with the safety record of our industries and wants to find out these answers for itself.

But there is a precedent for Congressional attitude on the question in the Coal Mine Safety Act, passed in 1941. It has teeth in it to the extent that 1,055 orders to close coal mines or sections of mines were issued, for one cause or another under the Act, for an 8-year period ending July 31, 1960. The estimated 1962 budget for inspections, investigations and rescue work to be conducted under that Act is $6,889,000.

The warning to the rock products industries is out, particularly if HR 8341 or a similar bill passes. Then, you have only two years to prove to the Secretary of the Interior and to Congress that your safety "house" is in order—to the extent that federal control of safety by legislation is not required.

U.S. Gypsum installs 24 Sweco separators in 16 plants

United States Gypsum Company's experience with SWECO Vibro-Energy* Separator performance ranges over 10 years and a variety of demanding applications. As a result of proved efficiency, economy and versatility, another SWECO unit was selected for installation at its recently completed, modern New Orleans quicklime facility. Also, the "turnkey" contract for design, engineering and construction was awarded to Southwestern Engineering Company.

This single-deck, 48" diameter SWECO unit is equipped with a ⅜" clear-opening screen cloth for processing calcined clam shells. Material runs from fines to 2" pieces, at 100-150°F and 58-60 lbs. per cu. ft. High capacity throughput with no screen blinding yields low operating and maintenance costs. Simplicity of design and lack of transmitted vibration required minimum space and structural support. For full details, application data, or free screening demonstration in *your* plant with *your* materials, write SOUTHWESTERN ENGINEERING CO., 4800 Santa Fe Avenue, Los Angeles 58, Calif. Department 5414.

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Operating in silica sand material, gravel producer Vulcan Materials had to rebuild tracks every six months. Then they tried a rubber-tired Michigan, report:

"Track costs eliminated! Production up 20%!"

"Abrasion—that's our problem here," says E. L. "Bud" Gist, plant superintendent for Vulcan Materials Company, Montgomery, Alabama. "Used to use a crawler in our gravel operations, and had to completely rebuild or replace a set of tracks *every six months*. Then we bought a rubber-tired Model 280 Michigan Tractor Dozer. Our records show it has *cut dozing costs considerably*. Track wear is a thing of the past, of course. And the Michigan's power and speed have *upped dozer production* by 20 percent."

Dozes sand waste

One good example of savings at Vulcan Materials' 25,000 ton-per-month gravel plant is on one of the 262 hp Michigan's primary assignments . . . dozing wet sand away from two 12-inch surge pipes which carry material from de-sander to waste pile. One-way pushes, from 30 to 300 feet, are made at about twice crawler speeds . . . yet wear on the rig's big 29.5-25 wide-base tires has been almost negligible. In fact, company officials estimate the Michigan will log "well in excess of 6,000 hours before tires will require retreading."

Cleans around de-sander

Four-wheel-drive Michigan also makes frequent trips from waste pile to de-sander (600 feet away) for cleanup duty. Here, with truck-like mobility, the speedy Michigan follows a haul unit under the hopper . . . blades away spillage . . . makes a maintenance run over the approach road . . . and returns to the sand waste pile . . . all in just a few minutes.

Maintains haul roads

Previously, the crawler required more than an hour to grade the two miles of plant roads. Now, the 262 hp Michigan blades off the same mileage in 30 minutes . . . easily keeps clear of haul units . . . and returns to its duties at the de-sanding plant before production lags.

Pulls out stuck haul units

Occasionally, the big 35 ton haul units, used to transport gravel from river bed to plant, "mire down" on the river approach road. Then the 28 mph Michigan quickly drives over (a dis-

tance of about one-half mile) . . . pulls the stuck haulers through the soft spots . . . and as quickly returns to its original task.

Works around re-screening plant 1.8 miles away

One of the greatest advantages of Michigan speed has shown up around the main re-screening plant, 1.8 miles from the de-sanding plant. Because of the distance involved, the crawler was never called on to work in this area. Now, when the Michigan can be spared from the sand stockpile, it quickly drives to the re-screening plant (in less than 5 minutes) . . . performs such tasks as spillage cleanup, dozing back the surge pile and, occasionally, feeding the re-screening hopper.

Reports Supt. Gist, "The Michigan can travel to the re-screener, do all jobs required, and return to the de-sander in less time than the crawler would have taken to travel the distance one-way. We sure are pleased with its all-around performance. Operating costs are low and availability excellent. With all the additional jobs the Michigan is doing for us, and with the way it has greatly assisted us in maintaining top plant production, I don't know how we ever operated without it."

Fourteen miles away, another Vulcan Materials' plant (the Conley Plant) also uses a Michigan to boost production—this time a Model 175A Tractor Shovel. The 2¾ yd Michigan loads out all trucks (½ ton to 20 tons), does all cleanup and stockpiling required at the 2,500 ton-per-day sand plant. After 3,000 hours of operation, Plant Superintendent W. M. Clark reports Michigan's performance "excellent . . . availability just as good."

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ROCKY'S NOTES

by Nathan C. Rockwood

Earliest American advocate of agricultural lime

THE PRODUCER AND MERCHANDISER of one or more of the various forms of "agricultural lime," using the term in its broadest coverage, do not lack scientific literature to assist them in sales promotion. Both the federal government and the various state agricultural experiment stations have issued reams of convincing facts and statistics. We have read, in the past 40-odd years, many of these publications; but it remained to read a reprint of "An Essay on Calcareous Manures,"* by Edmund Ruffin, to find a really interesting or, as some would say, a romantic discussion of the subject.

This small book is one of a series of reprints known as the John Harvard Library published by the Belknap Press of Harvard University "with the intention to create a library that will in time cover the full range of cultural achievement in this country. The purpose is to make significant books and documents from the American past available once more to scholars and the general public." First, it is interesting and instructive to know that this first American treatise on the value of calcium carbonate in agriculture should be considered by scholars a contribution to American culture, and second, that the author—being a real "dirt farmer" and a most enthusiastic advocate—has supplied many points in favor of liming we had not hitherto known. Moreover, we are interested in the author who, we presume, was an ancestor of the Ruffin family of tidewater Virginia, whom many of us remember in the person of Charles L. Ruffin, of the Massaponax Sand & Gravel Corp., Fredericksburg, Va., some 30 years ago. The Essay was published originally in 1832.

The author in his preface states: "The object of this Essay is to investigate the peculiar features and qualities of the soils of our tidewater district, to show the causes of general unproductiveness, and to point out means as yet but little used, for their effectual and profitable improvement. My observations are particularly addressed to the cultivators of that part of Virginia which lies between the seacoast and the falls of the rivers, and are generally intended to be applied only within those limits. By thus confining the application of opinions which will be maintained, it is not intended to deny the propriety of their being further extended. On the contrary, I do not doubt but that they may correctly apply to all similar soils, under similar circumstances, for the operations of nature are conducted by uniform laws, and like causes must everywhere produce like effects."

By way of explanation the term "manure" was used synonymously with our present term, fertilizer. Calcareous manure, in this case, was marl mined on Ruffin's own land, in which the calcium carbonate was in the form of shell fragments. It was not particularly high in calcium or magnesium carbonates, so that the results obtained—in view of modern products—were the more remarkable. Ruffin was familiar with the use of burned or quicklime, but did not recommend its use on soils except under unusual circumstances.

His whole theory of the special value of calcareous earth, or calcium carbonate, is largely covered in the following quotation: "Calcareous earth has power to preserve those animal matters which are most liable to waste, and which give to the sense of smell full evidence when they are escaping. Of this a striking example is furnished by an experiment which was made with care and attention. The carcass of a cow that was killed by accident in May was laid on the surface of the earth, and covered with about 70 bushels of finely divided fossil shells and earth (mostly siliceous), their proportions being as 36 to 64. After the rains had settled the heap, it was only 6 in. thick over the highest point of the carcass. The process of putrefaction was so slow, that several weeks passed before it was over; nor was

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*Harvard University Press, Cambridge, Mass., price $4.25

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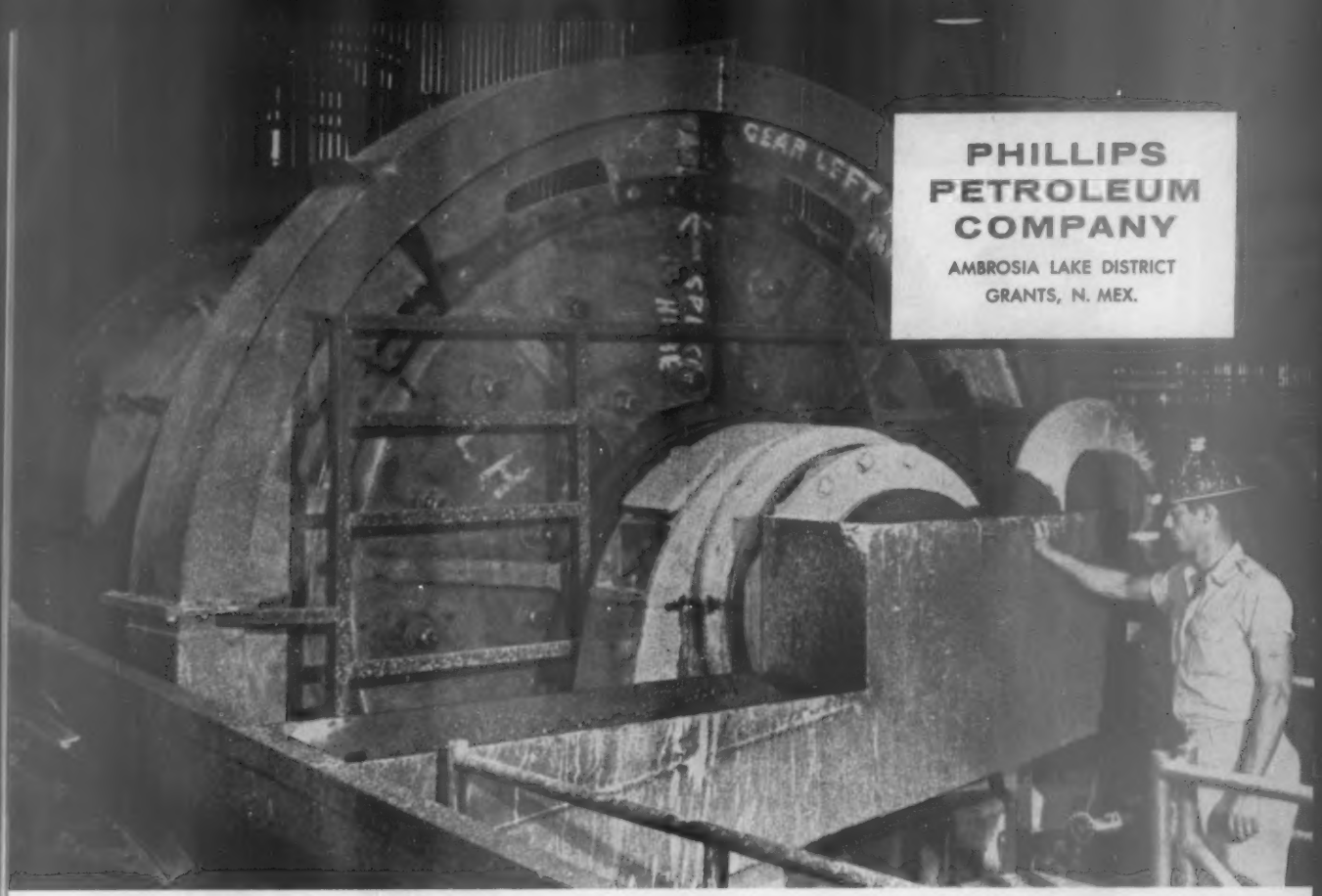

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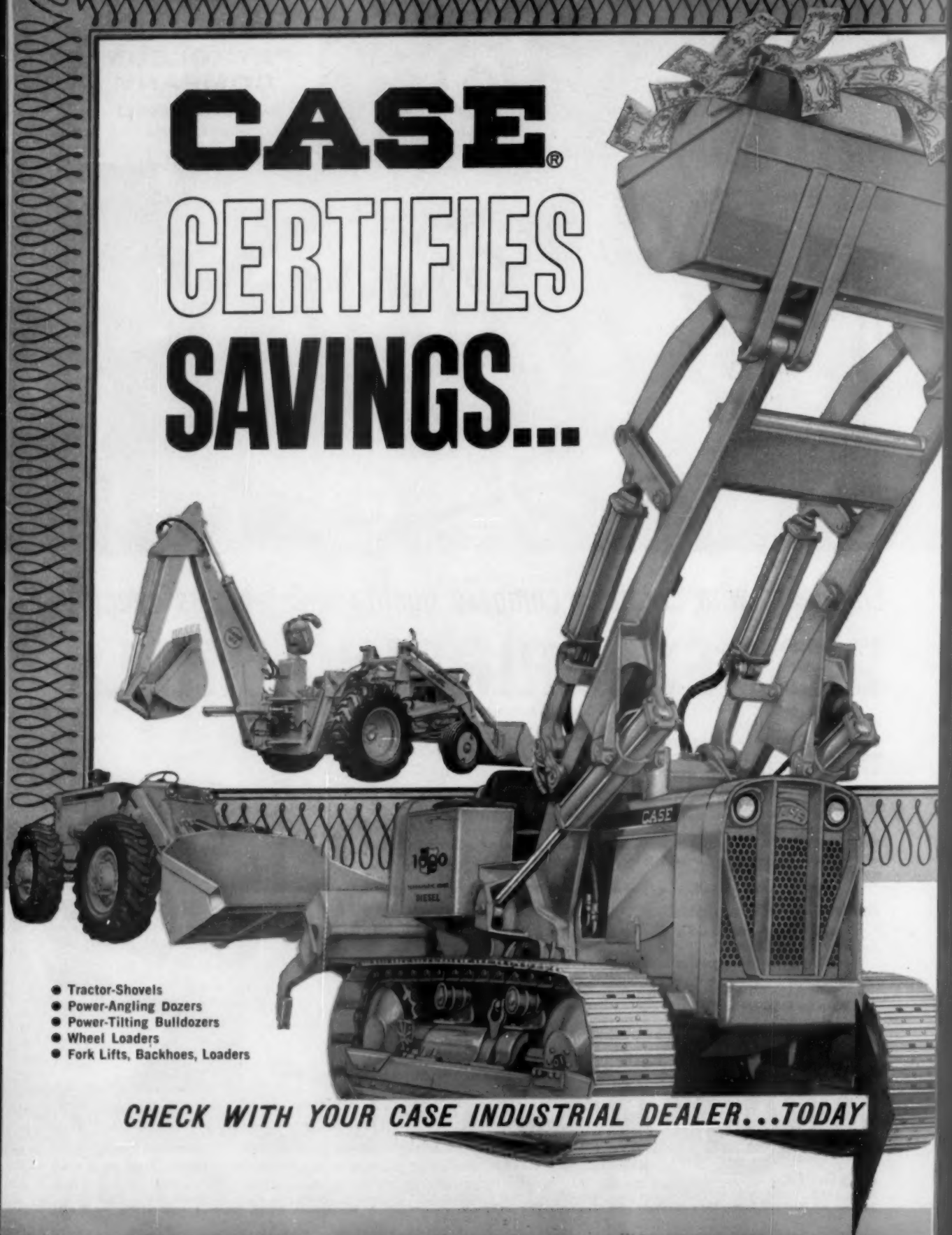

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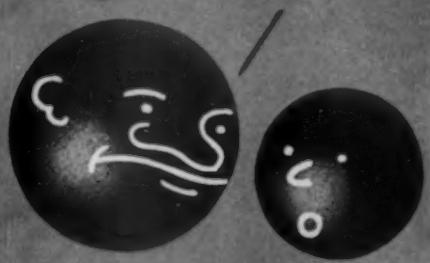

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WASHINGTON LETTER

by Edgar Poe

Prestressed Concrete use Is soaring

Use of prestressed concrete continues to increase. A survey conducted by the Department of Commerce's Building Materials Division shows that prestressed concrete products, turned out by 205 plants, were valued at $102 million. This rapid growth has added new vitality to the precast concrete products industry. The branch employs new equipment, engineering techniques and materials in the production of components and structures of prestressed concrete.

Construction of super highways is providing a growing market for standard bridge beams and shapes. Incidentally, prestressed concrete made its bow in the U.S. bridge building in December 1951, when a 24-ft. span bridge was erected near Hershey, Pa. It consisted of rectangular beams laid side by side to a 22-ft. width. Since then the Pennsylvania Department of Highways has built more than 500 bridges of this type.

Among the important uses of prestressed concrete in the late 1950's were the great bridge-tunnel crossing at Hampton Roads, Va., the long span over the Tampa, Fla., bay and the 24-mile causeway from New Orleans across Lake Pontchartrain.

Because of the increased use, it has been possible to establish the efficient use of production lines on some projects. An example of this is the Listerhill, Ala., basic aluminum plant completed in 1959. A total of 1,200 precast reinforced or prestressed columns, beams and wall panels has been made here by the production line method.

In its survey the Building Materials Division said that of particular interest in structural engineering is the use of prestressed folded plate roofs to cover spans longer than 100 ft., and the use of prestressed components in multi-story buildings. The 21-story Norton building at Seattle, Wash., was cited as having 200,000 sq. ft. of column-free office space because of the design and use of 70-ft. beam spans. A 35-story Los Angeles building will have steel columns and prestressed floors.

The versatility of prestressed concrete products, constantly broadening through technical development, has increased their utility in many different types of construction. New prestressing plants are efficient and suited for mass production. Development and research are actively pursued by the industry, and several new ideas—such as the technique for making extrusions and the use of slip forms for casting—currently offer considerable promise for the future. The industry also has provided a new market for producers of steel forms, special fasteners and hold-down devices, hydraulic jacks and gauges.

Concrete is much stronger in compression than in tension and is particularly suited for use in massive structures carrying only compressive loads, such as heavy foundations, piers and dams. Where concrete must withstand tensile stresses—as in beams, columns, bridges and liquid storage tanks—the concrete must be reinforced, because the tensile strength of concrete is only about 1/10 to 1/12 its compressive cylinder strength.

The techniques of design and use of reinforced concrete structures and components, such as beams, columns, girders, joists and slabs, have been in use for approximately 75 years. The method of steel reinforcement by embedding wires, cables or thin tubes under tension in concrete has been developing over the last 30 years. However, the method known as prestressing has found practical expression in the U.S. only in the last decade.

In prestressed concrete products, reinforcing steel is tensioned by controlled stretching, and then the reactive force of the induced tension in the steel is released against the concrete. The force acting on the concrete is compressive and counteracts or eliminates tensile stresses in the concrete under normal loads.

The Commerce Department reports that as of December 1959 only 16 plants were older than 7 years. A total of 104 plants, or 54 percent of the 194 plants specifying length of time in business, had been in operation less than 3 years.

Fabrication of prestressed concrete products was the sole activity of about one-third of these plants. Half reported they were engaged in the design, engineering or erection of prestressed concrete products. Most producers also manufactured concrete block or brick, pipe or ready-mix concrete.

Please turn page

Washington Letter

continued . . .

Rubber track Vehicle Designed

Experiments have begun on a revolutionary vehicle, designed to travel on water, hard surface, snow, mud or tundra. A $20,000-Army contract has been awarded to Chance Vought Corp. of Dallas, Tex., to conduct the experiments. The projected vehicle would operate on a continuous track of rubber-impregnated cells filled with low-pressure air, giving the vehicle high flotation capability and permitting it to ride over soft terrain or water. The machine, which will probably resemble a tank would have self-cleaning tracks, with air blowing away mud, dust or snow.

The contract award for the vehicle, called PAT (for Plenum Air Track), provides for a preliminary investigation of this new concept in transportation. Plenum is an air supply chamber which can be furnished with air automatically if pressure is lost. The cells would be self-sealing if punctured. Plans call for the PAT to travel about 10 mph. on water and 50 mph. on highways. The speed on water would be twice that of present amphibians.

Portuguese Cement Dumping

The United States Tarriff Commission is investigating a complaint that portland gray cement from Portugal is being sold in this country at less than fair value. The inquiry was initiated after receiving a report from the Treasury Department. The investigation was instituted under the Anti-dumping Act to determine whether a U.S. industry is being injured or is prevented from being established by reason of the importation.

2,000 new P.O. Buildings is Goal for 1961

Construction and leasing proposals for new post offices are being brought to the attention of businessmen. The Post Office Department supplied details on its construction-leasing proposals to the Department of Commerce, which is publishing the information in its "Synopsis of Proposed Procurement, Sales and Contract Awards." Similar information will be published on the awards made under these various agreements.

This step was taken to provide opportunities for more firms to know about and participate in this important source of business and investment. At the request of the President, the Post Office Department has been accelerating the program, with a goal of 2,000 projects valued at $170 million to be let between February 15 and December 15, 1961. To date 1,046 contracts worth $58 million have been awarded.

Paint sealer For masonry

Paint on masonry surfaces has been shown to withstand the elements better when applied over coats of a new isocyanata primer-sealer base recently tested by chemists at the U. S. Naval Research Laboratory. Tests of the new primer are described in a report available through the Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C.

Due to the wide variety and conditions of masonry surfaces, water-base paints used with customary surface sealants have not met with unqualified success. The new primer-sealer, however, contains a commercially available material of the isocyanate type that shows promise as a base for actylic emulsion paints.

It is a free-flowing, penetrating liquid. Upon evaporation of a solvent, the solid isocyanate reacts with atmospheric moisture and ultimately cures to a tough, resinous film. Spot tests at the Naval Research Laboratory showed the film had outstanding adhesive qualities after one year.

Postal rate Increase In sight

The Kennedy Administration is urging Congress to raise postal rates. Therefore Postmaster General H. J. Edward Day is seeking a one cent per ounce increase on first-class and airmail letters; a one cent increase on post cards and on the first two ounces of individual third-class mail; one-half cent per lb. and one-quarter cent per copy increases on second class domestic mail, and the imposition of a flat rate of one and one-half cents on some magazines, in addition to weight-distance rates.

Controlled circulation publications, primarily magazines going to a controlled list of technical and professional people, would be raised from 12 to 14 cents a lb., and their minimum rate would be increased from one to three cents per piece.

Excise tax On autos

The Korean War-levied excise tax on new automobiles will continue for at least another year, if not another decade. Congress has extended once again the tax which adds 10 percent to the retail price of new cars, and costs the public $1.3 billion a year.

GRIND MORE CLINKER AT LOWER COST/BARREL

by installing Pennsylvania Fine-Reduction Reversible Impactor ahead of finishing mills

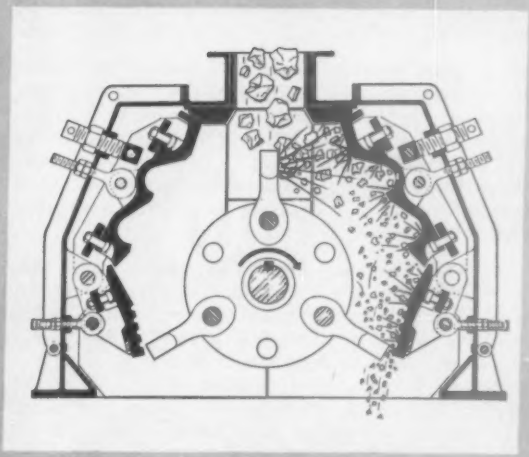
Pennsylvania Fine-Reduction Impactors producing fines for feed to finishing mills can increase clinker grinding capacity by as much as 35 percent. Existing installations in cement plants prove the value of compact Fine-Reduction Impactors to precrush clinker . . . effect large economies in the grinding operation.

In a single pass through the Impactor, clinker is exposed to multiple action impact crushing as it ricochets back and forth between whirling hammers and adjustable breaker blocks. This multiple action crushing by impact produces a maximum of fines. The finer the feed to the finishing mills, the less work to grind the clinker to correct size. Also, grinding balls can be smaller in size to glean additional grinding capacity from existing mills.

The multiple crushing action of Pennsylvania Fine-Reduction Reversible Impactors is also a real profit-making factor in tertiary crushing of limestone and cement rock. This low-cost, sturdy crusher with its multiple action impact crushing raises the percentage of fines to the raw grinding department. With a finer feed, the raw grinding mills can handle as much as one-third more tonnage without a heavy investment in additional grinding mills or other raw processing accessories.

The compact Pennsylvania Fine-Reduction Impactor, occupying a minimum amount of space between the existing secondary crusher and the raw grinding mills, is the best way to obtain more capacity from existing equipment within a tight, new-equipment budget.

Pennsylvania 5-38 Fine-Reduction Reversible Impactor occupies less than 18 sq. ft. of floor space. Note in cross-section drawing, the multiple action impact crushing of a Pennsylvania Fine-Reduction Reversible Impactor.



LET A TEST RUN PROVE IT!

Pennsylvania Crusher's extensive laboratories in West Chester are available to you at no obligation to determine if *your* raw and clinker grinding capacity can be increased to the degree enjoyed by other cement plants.

Your Pennsylvania Engineer will be glad to discuss Fine-Reduction Reversible Impactors with you . . . or write for free bulletin.

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

PENNSYLVANIA CRUSHERS

BATH-BUILT

Enter 1415 on Reader Card

No. 2 in a series of announcements on new HOUGH *machines*

This all-new 1¾ cu. yd. PAYLOADER

is far ahead

of any machine in its price class . . . in capacity, power, design and performance

The Frank G. Hough Co. has been engaged in a continuous program of research, development and improvement of exising models ever since it pioneered the first four-wheel-drive tractor-shovel. This program led to the new concept and design of the H-30 and H-120 PAYLOADER units which gained tremendous acceptance during the past two years and has helped to maintain PAYLOADER leadership.

The H-60 represents even further progress and development. It is a completely new machine in size and capacity with these special points of interest . . .

High Lift and Long Reach: Note the ease with which the operator deposits a full load in the hopper. Faster, more productive cycles are the result.

Safety and Convenience: All bucket and boom mechanisms are located ahead of the operator compartment for maximum protection. The steeply-sloped cowl and open design give 100% visibility. The comfortable, adjustable bucket seat and conveniently located controls make operation easy. The walk-in operator's compartment is easily accessible with safety ladder and hand rails.

Less Maintenance: Only PAYLOADER units like the new H-60 have a simplified boom mechanism with a single bucket tilt cylinder. This means you have from 4 to 10 fewer pivot and grease points and fewer parts to service and maintain. Furthermore, all pivot points on steering, boom and bucket mechanisms are fitted with "O" rings and other seals which keep grease in and dirt out to provide longer life and less maintenance. The hydraulic steering system uses two direct-acting rams with fewer pivot points.

"Keep-clean" Hydraulic System: A valuable, exclusive HOUGH feature is the closed and pressure-controlled hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough maintenance and easy servicing. There is a complete full-flow micronic filtering system.

"No stop" Full Power-shift Transmission: This HOUGH transmission was developed exclusively for rubber-tired tractor-shovel requirements and has been thoroughly proven on thousands of PAYLOADER units. All shifts, up or down, forward or reverse, can be made "on-the-go" with no stopping and engagement of gears needed for "range-shifts."

Sealed, 4-wheel Power Brakes: These powerful brakes are air-controlled with only touch-toe effort and are sealed against dust and dirt. Furthermore, the exclusive HOUGH axle design makes it possible to service and re-line the brakes without removing and exposing planetary hubs to dust and dirt. Another important HOUGH-pioneered feature is the "Operator's choice" dual brake pedals which permit braking with or without transmission engaged.

Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of both transmission and torque converter oil. Another exclusive HOUGH protective feature.

"Power-transfer" Differentials: Both axles are equipped with torque-porportioning differentials. When one wheel has better traction than the other on the same axle, it can automatically receive up to 38% more torque. This assures the best possible traction at all times.

The new H-60 model is offered with a choice of gasoline or diesel power and with buckets from 1⅛ to 3½ cubic yard capacities. (S.A.E. rated) For additional information and specifications, see your HOUGH Distributor or use the attached coupon.

THE FRANK G. HOUGH CO. 10-8-1
705 Sunnyside Ave., Libertyville, Ill.

Send full data on all-new Model H-60 "PAYLOADER"

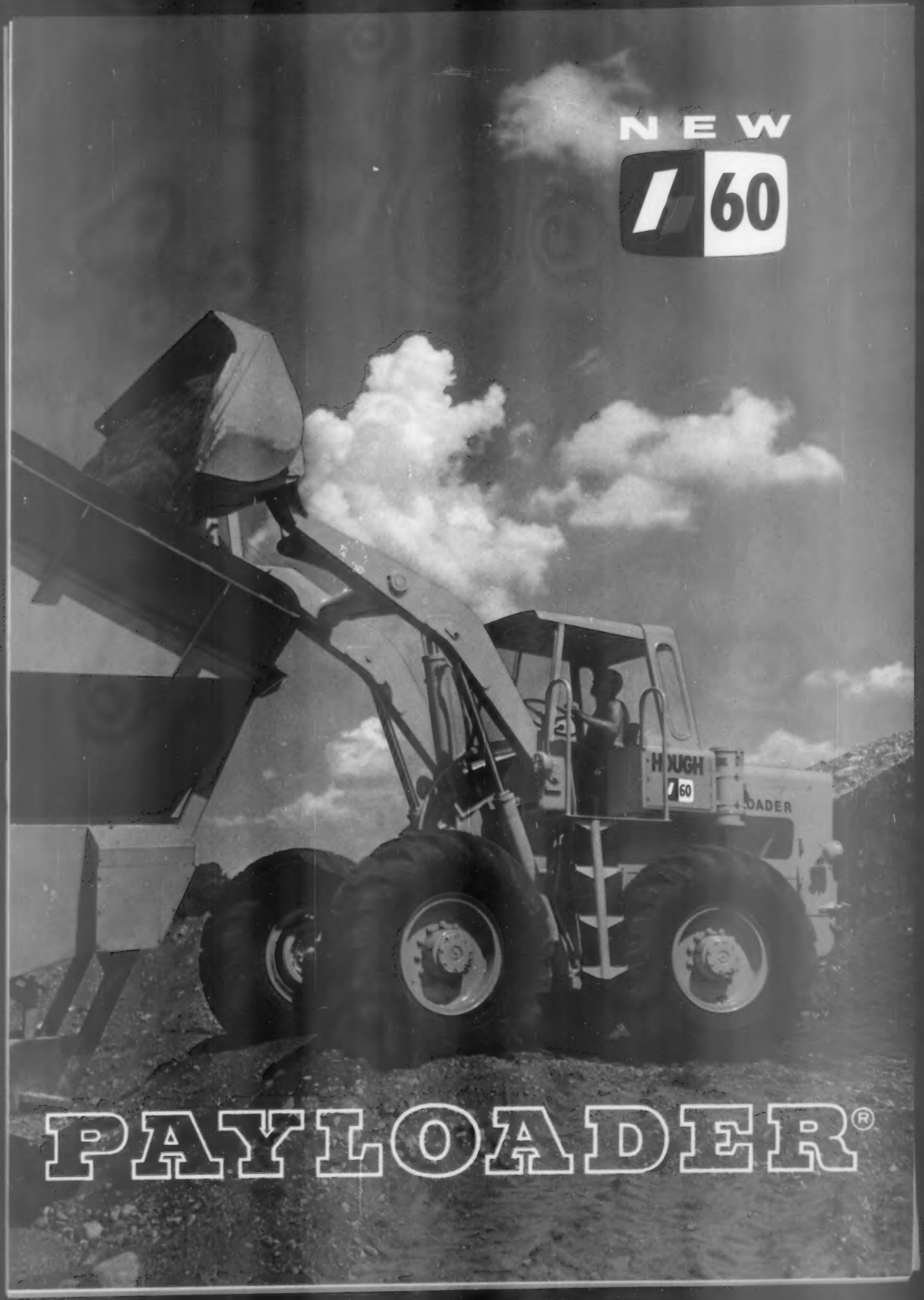
Name _____
Title _____
Company _____
Street _____
City _____ State _____

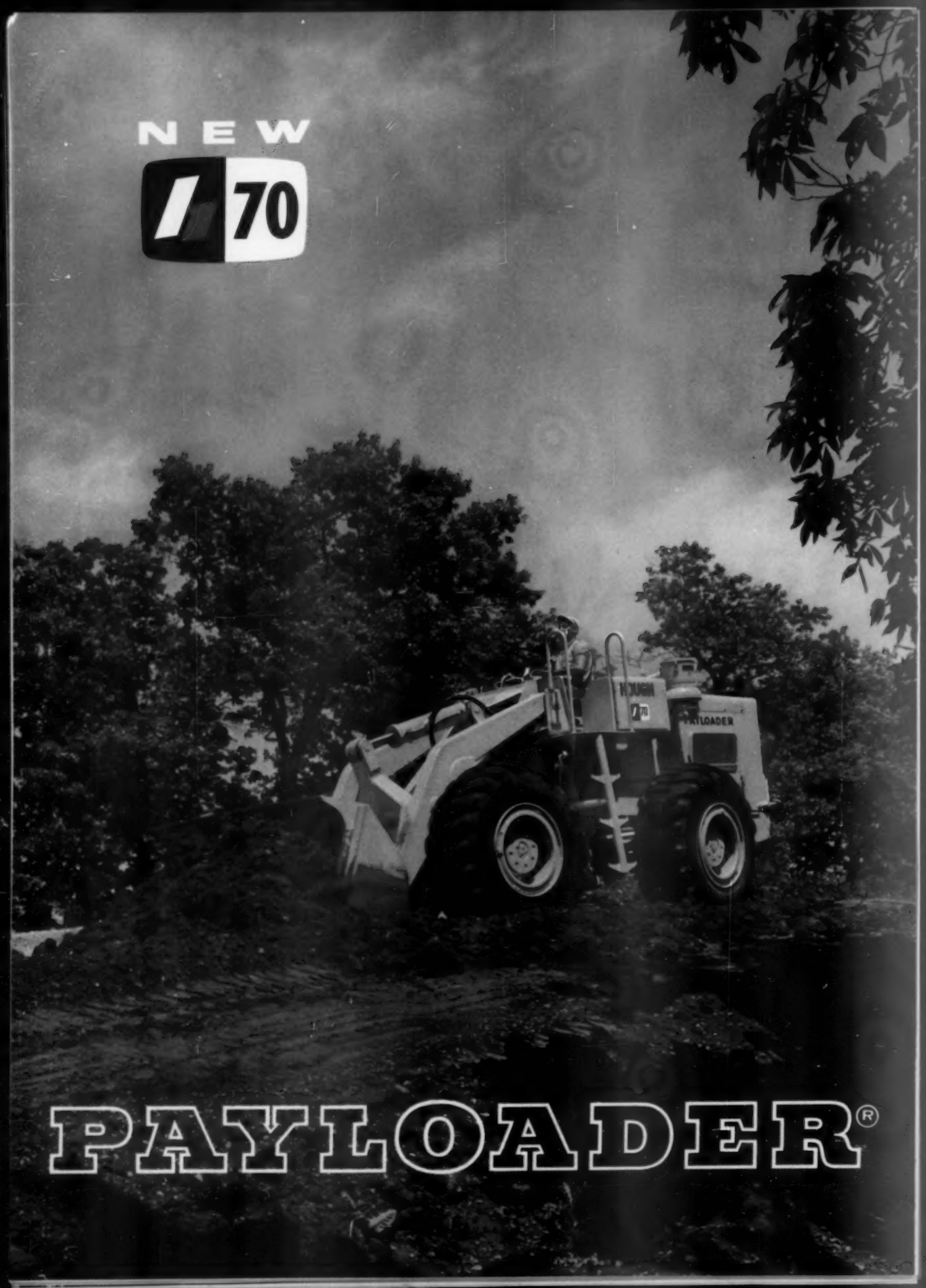
THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYDOZER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.

HOUGH®

Enter 1479 on Reader Card


NEW
60
HOUGH
60
PAYLOADER®


NEW
70
PAYLOADER®

No. 3 in a series of announcements on new HOUGH *machines*

The new 2½ cu. yd. PAYLOADER

has everything

according to the aggregate producers and contractors who tested this unit

The advanced design and exclusive features of this new H-70 series "C" model were subjected to many months of continuous, rugged testing by users on actual job-site locations before final evaluation.

Those items which contributed the most to the unmatched performance of the smaller H-30 and larger H-120 four-wheel-drive PAYLOADER models during the past two years served as a guide for the development of this completely new 2½ cubic yard tractor-shovel.

By comparison with the previous model, the H-70C has increased capacity, more power, greater flotation, additional reach, easier handling, simplified maintenance, new safety features and vastly superior performance. Some of the features are:

More Capacity: An increase of 25% in the size of the standard bucket, from 2 to 2½ cubic yards. (S.A.E. rated) Optional buckets from 1⅜ to 5 cu. yds. are available.

More Power: The new heavy-duty diesel engine delivers 148 hp which is an increase of 20% over the previous model. This gives the H-70C more horsepower per pound of machine weight than any comparable machine.

Safety and Convenience: All bucket and boom mechanisms are located ahead of the operator compartment for maximum protection. The steeply-sloped cowl and open design give 100% visibility. A comfortable, adjustable bucket seat and conveniently located controls make operation easy. Safety ladder and hand rails provide easy access to the walk-in driver compartment.

Less Maintenance: The only loader in its class with simplified PAYLOADER boom mechanism and single bucket tilt cylinder. This means you have from 4 to 10 fewer pivot and grease points and fewer parts to service and maintain. In addition, all pivot points on steering, boom and bucket mechanisms are fitted with "O" rings and other seals which keep grease in and dirt out to provide longer life and less maintenance.

"Keep-clean" Hydraulic System: A valuable, exclusive HOUGH feature is the closed and pressure-controlled hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough maintenance and easy servicing. There is a complete full-flow micronic filtering system.

"No-stop" Full Power-shift Transmission: This HOUGH transmission was developed exclusively for rubber-tired tractor-shovel requirements and has been thoroughly proven on thousands of PAYLOADER units. All shifts, up or down, forward or reverse, can be made "on-the-go" with no stops for any "range-shift" engaging of gears.

The H-70 series "C" has many other proven HOUGH features including a separate fan-cooled, oil-to-air radiator for effective cooling of both torque-converter and transmission oil; torque-proportioning differentials for better traction; "operator's choice" dual brake pedals which permit braking with or without transmission engaged. For complete information on the tractor-shovel that "has everything" see your HOUGH distributor or use the coupon.

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY - INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYDOZER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.

HOUGH®

THE FRANK G. HOUGH CO. 10-8-2
705 Sunnyside Ave., Libertyville, Ill.

Send complete data on H-70C PAYLOADER

Name _____
Title _____
Company _____
Street _____
City _____ State _____

Enter 1480 on Reader Card

LABOR RELATIONS

A roundup of actual day-to-day in-plant problems and how they were handled by management men

How would you decide?

If an employe is a stockholder, has he a right to take his complaints up to the president of the company?

What Happened: Two years ago Frank Hammond bought four shares of his company's stock. When he received his first annual report he was pleased to learn that the company officers encouraged the policy of communications from stockholders.

One day when things weren't going so well in his department, Frank picked up the phone and asked to talk to the treasurer. He said that he was an "employe and a stockholder." He got an appointment. When the treasurer heard his complaint he suggested that Frank take the matter up with his foreman.

A few months later Hammond, feeling that there were many wasteful practices in the production department, called the president of the company. The big boss came to the phone and Hammond proceeded to make suggestions on how to improve operations. For this and his previous activities he was given a warning notice which read in part ". . . this is to warn you to cease and desist from trying to contact and/or make appointments with company officials during working hours."

When he received the warning he asked for time off to go outside and call the president about the warning slip. This was refused. Hammond then complained of feeling ill and received a medical pass. He went home and put through his call to the president. When he came to work the next day he was given a week's disciplinary layoff. He grieved:

1. I called the president from my own home—at my own expense and on my own time. You have no jurisdiction over me.

2. I'm being penalized for exercising my rights as a stockholder. In fact, the company encourages stockholders to contact company executives.

The company maintained that Hammond was an employe and that it had a right to clamp down on his "harassment" of company officers.

Was the company:
Right? ☐ **Wrong?** ☐

What an Arbitration Board ruled: "When he asked for the pass to go home after receiving the warning, and then telephoned the president, Hammond was acting in direct defiance of the written warning—and of previous verbal warnings to stop bothering company officials. As a stockholder he could not don a cloak of immunity for this action, since the basic purpose of his call was to protest the warning he had just been given. That warning was given to him as an employe—not as a stockholder—and his proper recourse as an employe was through the grievance procedure. This is an employe relations problem, not a stockholder's problem. The company had proper cause for the disciplinary suspension."

Please turn to page 38

Enter 1418 on Reader Card

KW-DART TRUCKS HELPED MAKE TOQUEPALA 125 MILLION TONS DEEP

This year's repeat order for 30 more KW-DART trucks is proof of performance on a tough job!

In 1956, Southern Peru Copper Corporation purchased the first of a total of 75 twenty-five ton capacity KW-Dart trucks to be used in the development of its 237-million-dollar copper mine at Toquepala, Peru, South America.

Toquepala's ore-body lay under 125 million tons of waste material, which had to be removed as economically as possible. It was a staggering task—but the KW-Dart trucks measured up. Result: This year—KW-Dart received a repeat order for 30 thirty-seven ton capacity trucks for continued operations at Toquepala.

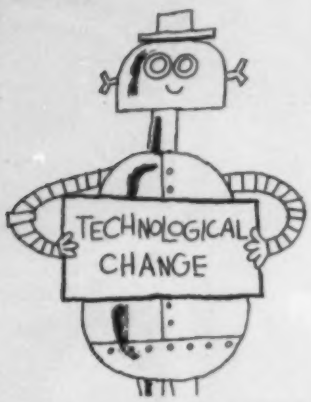
For information on how custom-engineered KW-Dart rock and ore movers can bring fast-cycling capacity and economy of operation to *your* job, write:

KW-DART® TRUCK CO.

1301 North Manchester Trafficway, Kansas City 20, Missouri, U. S. A.

Labor Relations

continued from page 36



If a company begins to "automate," does it have to reopen its union contract for renegotiation?

What Happened: When the company installed three automatic machines, 48 workers were displaced. They were given other jobs and paid their former wages until the rates on their new assignments caught up.

It was the company's policy to let the labor force decline through normal attrition.

Said the union, "This is not just a technological change but a completely new concept. Automation is a change so big that it calls for a whole new set of labor-management relationships. We have a 3-year contract. Does this mean that during that period the company has a right to make drastic changes in wages and job assignments without the union coming into the picture? We want to bargain on 'automation' because there is nothing in the agreement that covers it".

The company refused. It held to the position that "automation" is just another word for "technological change." Under the existing contract it had a right to make job changes—and automation had not introduced anything new into the union-management relationship.

Was the company:
Right? ☐ Wrong? ☐

What an Arbitration Board ruled: "This Arbitration illustrates the growing importance of technological change in industrial relations. Employers want maximum flexibility to take advantage of technological possibilities and reduce production costs. Unions desire to conserve employment opportunity, prevent loss of jobs and share the fruits of technology. The agreement does not prohibit the company from displacing employes as a result of technological changes. Certainly this is a managerial right in American Industry, except where limited by law or contract. The union argues that mechanization must be distinguished from automation. Though various operations have been mechanized in the past, the company is now being completely automated. If there is any distinction between 'mechanization' and 'automation' we can find no recognition of it in the agreement. The company did not assume an obligation to negotiate concerning changes in compensation and jobs as a result of automation."

Can you fire an employe who fails to "make the grade" after 11 years?

What Happened: Year after year Ed Conrad was "given another chance." Everyone agreed that he was a nice, well-mannered man—but in his work he was slow, inaccurate and inadequate. Talking and training were of little help—he just couldn't catch on. In 11 years he was shunted from one foreman to another. When one supervisor got fed up with his incapability, he would pass him on to another. Finally, the company made a move—he was fired. The union took up his case:

1. Why did you wait so long to make up your mind? It's not so easy for Mr. Conrad to find another job.

2. This man had 7 transfers in 11 years. No wonder he was confused and unable to work.

3. You did a disservice to this employe by keeping him so long. Now find him some work somewhere else in your plant.

The company replied:

We tried and tried—for 11 years to get him up to par. We failed. Are we therefore saddled for life with an incompetent worker because of the fact that we were "softies?"

Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Turkus ruled: "The shunting of this employe from foreman to foreman is morally and logically unsustainable. Foreman after foreman simply 'passed the buck,' each seeking to avoid the unpleasant task of facing up to reality in the case of an earnest employe who was doing his 'level best' to make good—but who was never a satisfactory clerk and was never 'cut out' for such a role. This procedure was no favor to Mr. Conrad—but was a disservice to him and to the company. All that was accomplished was a waste of years for the employe, and the inevitable and demoralizing humiliation of discharge for inefficiency after long years of conscientious effort—and the concomitant economic waste to the company. If merit ratings had any significance, it was evident to higher supervision that he was emotionally and temperamentally unsuited for the work. It was clearly evident that the employe was trying to do his best but was incapable of performing the duties. The right of the company under the contract to discharge the employe is established and must be sustained. The grievance is denied."

END

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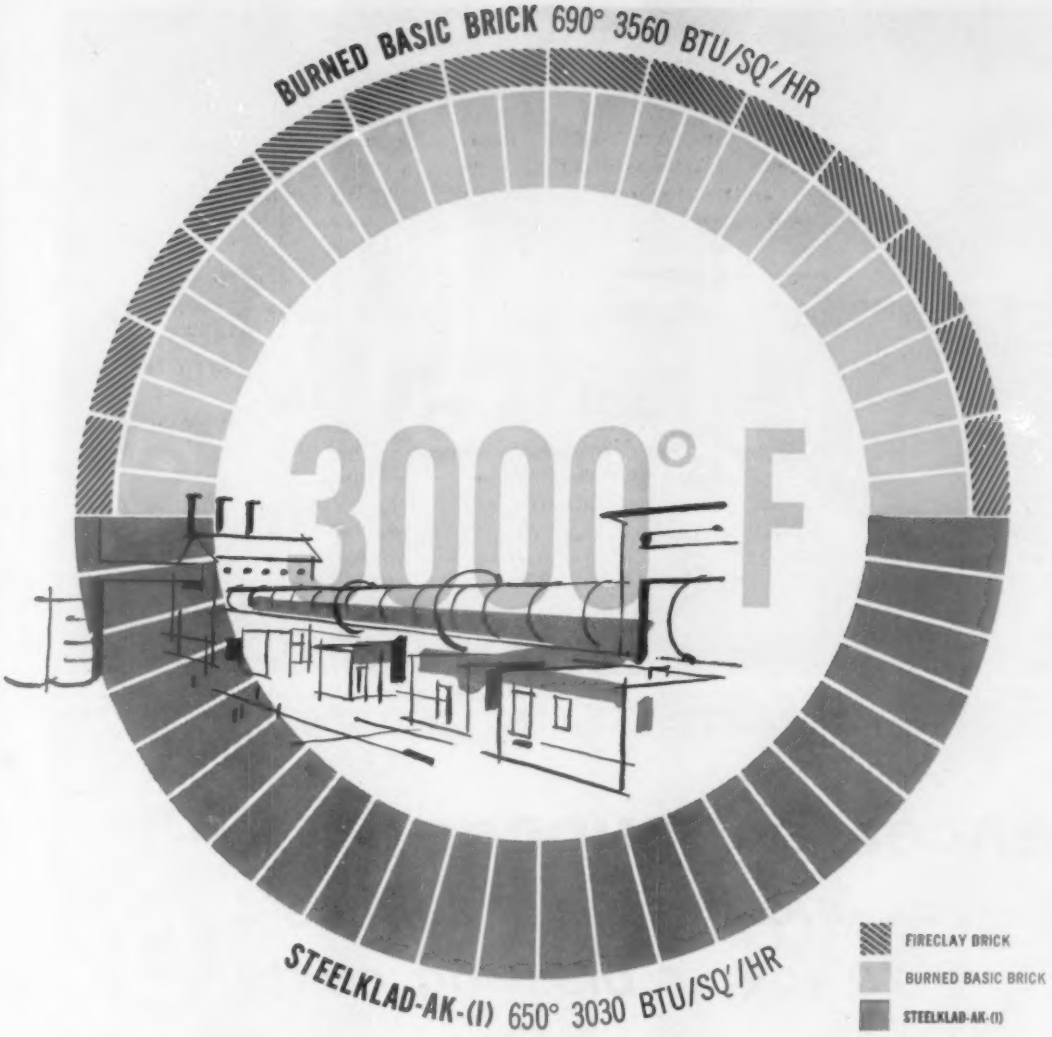

GENERAL REFRACTORIES

GREFCO STEELKLAD-AK-(I) BASIC KILN LINERS CUT HEAT LOSS UP TO 20% (And, reduced heat loss is reduced fuel costs)

The superior insulating properties of GREFCO's amazing Steelklad-AK-(I) keeps the heat you pay for inside the kiln where it belongs. You don't pay for wasted kiln heat. And, Steelklad-AK-(I) stretches your labor dollar even further by cutting downtime and installation time.

No competitive burned basic brick can match Steelklad-AK-(I)'s cost-cutting contribution to your operation. But, drastically reduced fuel and labor costs are only part of the Steelklad-AK-(I) story. With Steelklad-AK-(I) you get faster response to changes in firing rate, and improved product quality. And, the assurance in knowing that Steelklad-AK-(I) is produced by GREFCO—producer of superior refractories for fifty years.

To learn how GREFCO Steelklad-AK-(I) Basic Kiln Liners can help improve your product, *and* save you money—call your GREFCO representative. (Or write GREFCO, 1520 Locust Street, Philadelphia 2, Pennsylvania.)

GENERAL REFRACTORIES COMPANY DISTRICT SALES OFFICES IN ALL PRINCIPAL CITIES

50th Anniversary 1911-1961

First local supply center for Spencer pre-mixed ammonium nitrate blasting agent (NCN-1) is located at Carlsbad, New Mexico. Similar plants are proposed for other sections to fill local needs for low cost pre-mixed compounds of guaranteed uniform quality. Spencer NCN-1 Nitro-carbo-nitrate will be available in handy 50-pound bags.

Spencer announces NCN-1*

. . . another new service to lower blasting costs

More blasting efficiency for every dollar you spend! That's the promise of Spencer's far-ranging research program. This continuing program of investigation explores every new and better method of making blasting more efficient, safer, and less expensive.

Newest development in Spencer's program of maximum service to mining and construction users of blasting materials is an NCN-1 (Nitro-carbo-nitrate: pre-mixed ammonium nitrate blasting agent) plant in Carlsbad, New Mexico.

Designed to deliver NCN-1 by truck in handy 50-pound bags to the site where they are to be used, this new plant is the first of a network of producing depots that will provide local sources of supply to users in every part of the country.

Pre-mixing of the ammonium nitrate blasting agents provides a cleaner, easier to handle compound with more uniform blast output. Initially, the Carlsbad plant output has been established to meet current daily demands, but capacity expansion is planned to meet anticipated future increases in local usage.

And, of course, Spencer's NCN-1 is substantially less expensive than dynamite. But that's not all. Spencer's NCN-1 will provide 10% to 20% more blast energy than field compounded ammonium nitrate-fuel oil mixtures. That's accomplished through easier detonation resulting from the optimum density of the Spencer mixture and the special prill structure of Spencer's N-IV* ammonium nitrate which enables it to absorb fuel oil more evenly.

Spencer research has paid other use dividends to users of blasting materials. SPENITE*, Spencer's remarkably efficient boosting material, was made possible when Spencer investigators proved that in boosting ammonium nitrate-fuel oil mixtures, the heat generated was more important than the velocity of the detonator. As a result, SPENITE boosters provide 50% more explosive heat than any other commercial booster.

And Spencer research is responsible for the efficient Powder Monkey* pneumatic loading machine. 40 of these units currently in the field have proved that a two-man team using the Powder Monkey can outperform any other method of filling horizontal holes with blasting charges. It's another way Spencer makes blasting more efficient and at the same time, slashes costs to the bone.

For information on any of the advanced Spencer products for blasting, simply write to Spencer Chemical Company, Dwight Building, Kansas City, Missouri.

*Trademarks of Spencer Chemical Company

Only Spencer research uses advanced underwater testing methods adopted from military research to develop safer, more efficient blasting methods. Tests have proved ammonium nitrate and fuel oil delivers up to seven times more useful energy per dollar than gelatin dynamites.

A low-cost initiator is provided by Spencer SPENITE. Made specifically to detonate ammonium nitrate mixtures, SPENITE threads easily on detonating cord. Knots hold boosters in place when cord is lowered into hole. Results: big cost reductions in the detonation.

Bulk ammonium nitrate (N-IV), a step forward in reducing material and handling costs, has been accepted by a number of users. Why not investigate the pickup or delivery of money-saving bulk ammonium nitrate from Spencer. Customers report their explosive costs cut in half when they use Spencer N-IV.

Spencer Powder Monkey is the easiest, most economical method ever devised to fill blast holes. One two-man team recently filled and blasted more than 250 holes in one eight-hour shift while using this Spencer Powder Monkey pneumatic loader.

*Trademarks of Spencer Chemical Company.

Look to Spencer research for continual advances in blasting efficiency and economy.

SPENCER®

SPENCER CHEMICAL COMPANY
Dwight Building • Kansas City, Missouri

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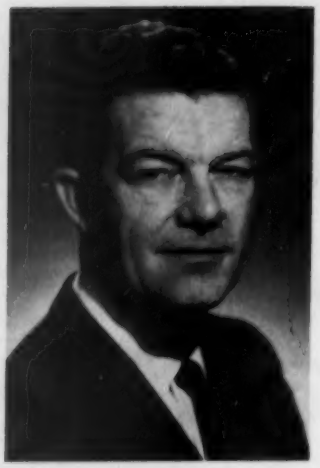
PEOPLE IN THE NEWS



Harper, Jackson elected Permanente vice presidents

Claude E. Harper, (left), vice president and general manager of Kaiser Gypsum Co., and William P. Jackson (right), vice president and general manager of Glacier Sand & Gravel Co., have been elected vice presidents of Permanente Cement Co.

Mr. Harper joined Permanente Cement Co. in 1941 as an oil well cement salesman. He was division sales manager for the company in Hawaii and became general manager of Kaiser Gypsum Co. in 1947. He was appointed vice president and general manager in 1951.

Mr. Jackson became associated with Kaiser Paving Co. in 1931. He was a technician and salesman with Kaiser Sand & Gravel Co. from 1936 to 1941 and became operations manager of Glacier Sand & Gravel Co. in 1946. He was elected vice president and general manager in 1955.

Allan Bates to direct NYU research center

Dr. A. Allan Bates, formerly vice president for research and development for the Portland Cement Association, Skokie, Ill., has been named director of University Valley, New York University's new research and educational center in Sterling Forest, N.Y.

Dr. Bates has been associated with PCA since 1946. During this period he organized and administered laboratories devoted to research and development of cement and concrete and their uses. From 1938 to 1946 Dr. Bates was manager of chemical, metallurgical and ceramic research at Westinghouse Electric Corp. During the previous 10 years he was a professor of metallurgical engineering at Case Institute of Technology in Cleveland, Ohio.

In addition to arts and sciences degrees from Ohio Wesleyan University and Case Institute of Technology, Dr. Bates holds a doctorate in science from the University of Nancy, France. He also has received honorary doctorates from Rose Polytechnic Institute and Stevens Institute of Technology.

Dr. Bates has just completed a term as president of the American Society for Testing Materials and continues as a director. He also is a director of the American Concrete Institute and a member of the executive committee of the Building Research Advisory Board of the National Academy of Sciences.

James Eades on NLA staff

James L. Eades, National Lime Association's research fellow at the University of Illinois, is now serving NLA on a full-time basis. He will continue his research on lime and clays and lime-silica reactions from his laboratory at the Department of Geology, Urbana, Ill., as well as provide technical services. NLA now has a permanent research center.

American-Marietta appoints director and vice president

Harry N. Huntzicker, executive vice president of American-Marietta Co., Chicago, Ill., has been elected to the board of directors, and Edwin G. Delcher has been named a vice president in addition to being treasurer.

Please turn to page 46

Enter 1408 on Reader Card

2200 HOURS OF WORK– NOT ONE MINUTE OF DOWN TIME

2200 hours of trouble-free service. That's the record established by this D7D Tractor since its delivery last May to the Calera Quarry in Birmingham, Alabama, a division of the Vulcan Materials Co. The machine handles stockpiles, working two eight-hour shifts, five days a week.

There are several reasons behind this dependable service. Consider, for example, the tractor's Caterpillar lifetime lubricated track rollers. Bigger and stronger than former D7 rollers, they *never* need attention until rebuild time—*and rebuild time is a long time coming.*

The tough undercarriage is only one important feature of the new D7 . . . there's a 140 HP CAT TURBOCHARGED ENGINE that pushes blades full of rock with only ounces of fuel . . . there's an exclusive CAT OIL CLUTCH that will outlast any dry-type clutch . . . there's a PRESSURE-LUBRICATED POWER TRAIN that ignores shocks and heavy loads, keeps the tractor producing season after season . . . and there are other features like the new DRY-TYPE AIR CLEANER that takes out *at least* 99.8% of all dirt even under the worst conditions, and takes only about five minutes to service.

A new D7 could be the tractor you need in your operations . . . talk it over with your Caterpillar Dealer . . . there's no better place to invest equipment dollars.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

DEPENDABLE PRODUCTION WITH A NEW D7D

AUTOMATED READY-MIX PLANT BATCHES 2,000 cu. yd. DAILY, PRODUCES 1,500 MIXES

Five Barber-Greene conveyors coordinate movement of materials in show-place plant of Cleveland Builders Supply Co.

The Cleveland Builders Supply Co. ready-mix plant can produce 1,500 different mixes under electronic batching control.

When operations began in 1955, the plant was considered the largest commercial installation of its kind in the country. Because of site limitations, it is equipped with every modern device for control of each operation.

General Manager J. C. Ehle gives this report why five Barber-Greene belt conveyors totalling over 750' were selected for this show-place plant: "We rely on electronics to eliminate human errors in batching and we rely on Barber-Greene conveyors to coordinate movement of materials in the plant without production stoppages. Our experience with Barber-Greene conveyors goes back to the '20s. We've never touched an idler on any conveyor in this plant and our maintenance since 1955 amounts to one pulley replacement."

Discover why Barber-Greene conveyors move more material than all other conveyors combined in the aggregate and concrete industries. Your Barber-Greene conveyor specialist will gladly explain how standardized components, specially engineered components, or a combination of both can bring increased efficiency and lower materials handling costs to your installation.

Your belt conveyor equipment headquarters

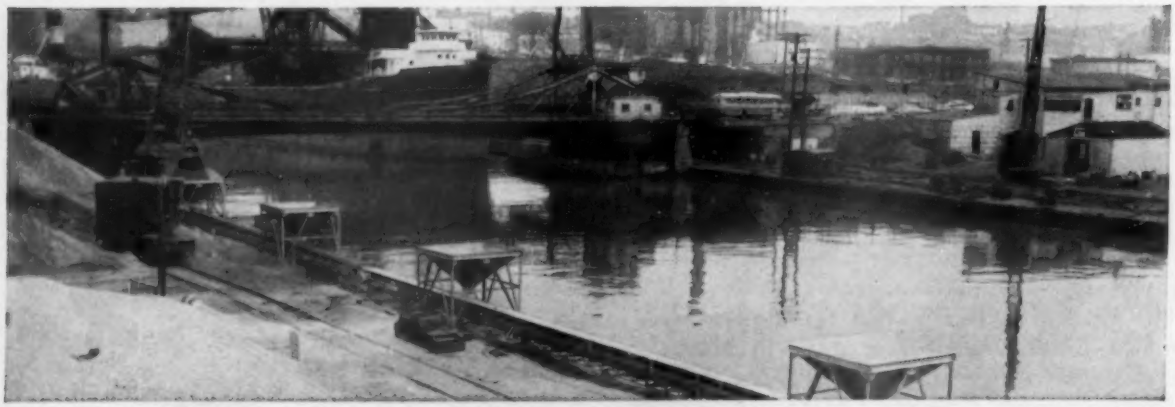
Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Locomotive crane is shown reclaiming aggregates from stockpiles and charging four bins. Two Barber-Greene conveyors beneath bins move materials toward batching tower.



Overall view shows C.B.S. plant layout on minute 3.2 acre site. Self-unloading boat is shown stockpiling 11,000 ton load of aggregate.

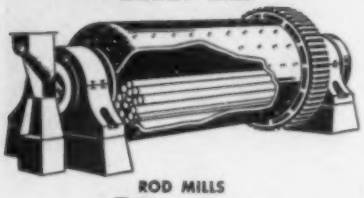
Operator merely selects card for the mix needed, and then electronic batch control system takes over, producing the desired mix automatically. Daily production: 2,000 cu.yd.

Some of 145-truck fleet are shown moving ready-mix to customers. C.B.S. is a 100% Barber-Greene conveyor user in other plants in Cleveland area.

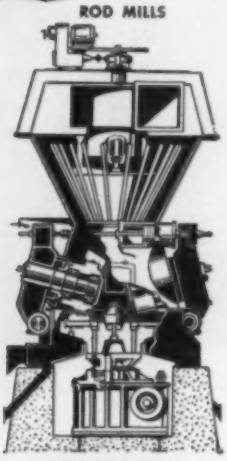
Enter 1416 on Reader Card

GRINDING AND PULVERIZING

CASCADE® MILLS



ROD MILLS



DISC-ROLL MILLS

TUBE MILLS

CONICAL AND TRICONE MILLS

No matter what your grinding problem—coarse or fine grind—ball, pebble or autogenous—Hardinge has a mill for the job.

CASCADE® MILLS

A continuous mill using the autogenous grinding principle—large pieces of material grinding the smaller ones. Shape of the mill causes maximum "free fall" and impact. Feed is divided into coarse and fine components and re-combined in proper proportion for best grinding.

ROD MILLS

Steel rods are employed as grinding media. Ideal for producing minimum oversize in open circuit grinding. Conical heads prevent "choking" of the charge at the ends, and align the rods. Available with either end, or center, peripheral discharge, as well as trunnion overflow.

DISC-ROLL MILLS

A roller-mill with rotating grinding table and pneumatically or spring loaded rolls for complete flexibility of operation. The Gyrotor® Classifier, combined with the Disc-Roll Mill, provides a highly-efficient dry-grinding device, ideal for relatively soft minerals.

TUBE MILLS

For a fine product in open circuit without the use of classifiers. For mixing and grinding to secure a smooth texture or plastic product. Often used as an autogenous grinding mill.

CONICAL MILLS®

The shape of the Hardinge Conical Mill causes a rapid circulating and classifying action within the drum, which increases the capacity for power expended over other types. The range of grinding is large, due to segregation of media and material within the mill.

TRICONE* MILLS

Built on the same principle as the Conical Mill, the Tricone Mill offers greater grinding volume for a given amount of floor space than any other tumbling mill built. Extremely efficient. Ideal for large tonnages. Sizes up to 12 ft. diameter.

Write for Bulletin 17-C-1.

*Trade-mark

HARDINGE
COMPANY, INCORPORATED
Main Office and Works • 240 Arch St., York, Pa.
"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
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People in the News

continued from page 42

Keith Callanan named president of Callanan Road Improvement Co.

Keith M. Callanan was recently elected president of The Callanan Road Improvement Co., South Bethlehem, N.Y. He succeeds J. Reid Callanan, president since 1944, who has been made chairman of the board.

Keith Callanan, a graduate of Rensselaer Polytechnical Institute, has spent his entire business career with the company. He is a past director of the New York State Bituminous Concrete Producers Association.

Universal Atlas Cement names Bushnell personnel director

Philip N. Bushnell has been named director-personnel services of Universal Atlas Cement Div., U. S. Steel Corp., to succeed Gordon C. Huth, vice president-industrial relations, who has retired after 46 years of service.

Mr. Bushnell, a native of LaGrange, Ill., attended Beloit College, Wis., before entering industrial relations work in 1927 as assistant to the managing director of the National Safety Council, Chicago. In 1933 he became safety engineer for the Portland Cement Association in Chicago. Four years later he was named industrial relations director for Missouri Portland Cement Co., St. Louis, and in 1943 joined Universal Atlas as assistant manager of industrial relations. In 1955, he was appointed director of labor relations, in which position he served until his present appointment.

Mr. Bushnell is a member of the Industrial Relations Research Association, and past chairman and member of the Executive Committee of the Cement & Quarry Section of the National Safety Council.

Please turn to page 48

3022

From the bountiful magnesite deposits at Kilmar in the province of Quebec, Canada, comes a basic refractory brick called MAGNECON* —the most successful hot zone kiln liner in the world.

CANADIAN REFRACTORIES LIMITED
Canada Cement Building, Montreal - Canada

write for technical folder " 'MAGNECON', the hot zone refractory to keep your kiln on the line".

*Reg'd T.M.

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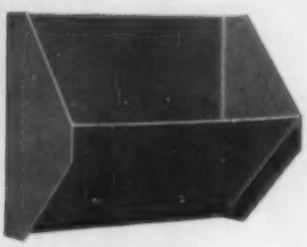
STANDARD METAL
ELEVATING
AND
CONVEYING
EQUIPMENT

... Engineered for quality and long life

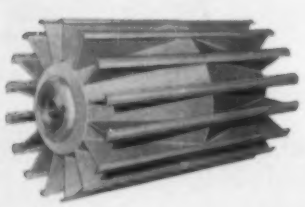


CONTINUOUS ELEVATOR BUCKET STYLE #2.

Available also in Salem, Style "A" and other continuous style buckets.

DUPLEX BIN GATE.

Single Bin Gates also available.



WING-TYPE SELF-CLEANING PULLEY

Dodge Taper-Lock® Hubs and Bushings standard. Available also with solid hubs bored to specifications.

WRITE FOR THE COMPLETE CATALOG

SM16

STANDARD METAL MFG. CO.
111 CENTER ST. ● MALINTA, OHIO

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People in the News

continued from page 46

Alpha names Sherod manufacturing director

Joseph O. Sherod has joined Alpha Portland Cement Co., Easton, Pa., as director of manufacturing. He was formerly general manager of production for the Lime Div. of Warner Co., Philadelphia.

Jay F. Simpson has been named director of sales. He was formerly director of sales for Barrett Div. of Allied Chemical Corporation.

ILPA elects three board members

Robert R. Welp, vice president, Ft. Dodge Limestone Co., Inc., Ft. Dodge; G. M. Mason, general sales manager, Concrete Materials & Construction Div., Cedar Rapids, and B. W. Carpenter, manager and superintendent of Wendling Quarries, Inc., Atalissa, have been elected to the board of directors of the Iowa Limestone Producers Association. The board now has 58 members, representing 90 percent of the volume of business of the industry in Iowa, according to Robert L. Miller, who is executive secretary.

Sengelman named to manage Idealite plant

Eugene Sengelman has been appointed plant manager of the new Idealite Co. plant, Rocky Flats, Colo., a subsidiary of Ideal Cement Co., Denver, Colo. A native of Iowa, Mr. Sengelman joined Ideal Cement Co. in 1954 as a design engineer and has served as project engineer and project manager of the Idealite plant construction program.

General foreman of the new plant is Linus W. Freeman, who held a similar position at the Idealite plant in Laramie, Wyo. As general foreman, he will be responsible for the plant's production operations. He has been associated with Idealite Co. since 1956, starting as a maintenance man and later becoming mill foreman.

Martin W. Mechling has been named maintenance supervisor. He joined the company in 1957 and has served as design engineer, project engineer and construction engineer.

OBITUARIES

Howard S. Ponzer, vice president in charge of engineering and development, Giant Portland Cement Co., Philadelphia, Pa., passed away suddenly on Monday, August 21. He was 54 years old. Mr. Ponzer joined Giant in 1949 as superintendent of the Harleyville, S. C., plant. He had been vice president in charge of engineering and development since 1952.

A graduate of the University of Illinois, Mr. Ponzer served for 13 years in the research department of the Portland Cement Association. He left there in 1940 to become associated with Missouri Portland Cement Co. Two years later he joined General Portland Cement Co. as a special engineer. He served as superintendent of the Houston, Texas, plant from 1945 to 1949, at which time he joined Giant Portland Cement Co. Mr. Ponzer was a member of the General Technical Committee of the Portland Cement Association.

Harry J. Mullin, manager of the Ohio River Sand Co., Louisville, Ky., died July 10 following an illness of several months. He was 67 years old.

END

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BIGGEST LINE

OF HIGH-PERFORMANCE SCREENS

Allis-Chalmers has it. And what does that mean to you? Assurance that you'll get *THE* screen to best help you cut processing costs and improve product flow.

Consider the screen illustrated: A high tonnage 8' x 16' model XH *ROM* scalper. This husky type screen can handle almost unlimited feed sizes and tonnages. Looks capable and it is — as are all members of the A-C line.

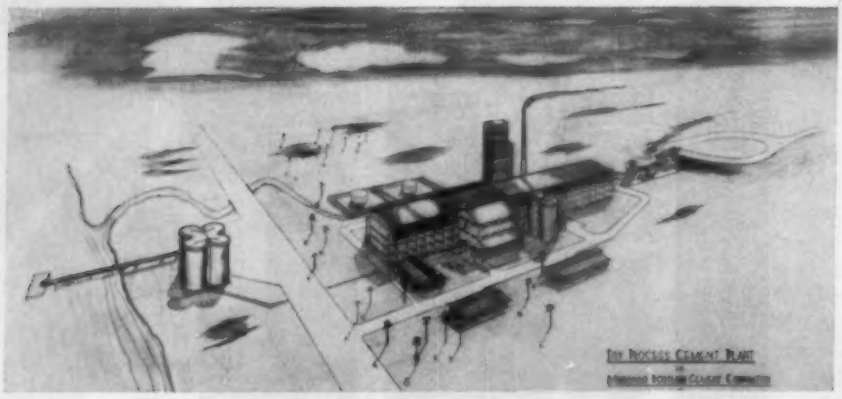
The dependable *Low-Head* horizontals have been solving screening problems for years. The others, *Ripl-Flo, Aero-Vibe,* the four bearing screens and the *all new,* modern heavy duty vibrating feeder, combine to fulfill any of your scalping, sizing, rinsing, washing, media drain and dewatering needs.

Ask your A-C representative to help with your screening requirements or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1537

ROM, Low-Head, Aero-Vibe and Ripl-Flo are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Equipment arriving in Philippines for 3,000 bbl. per day cement plant



By early next year, a 3,000 bbl. per day cement plant should be in operation near Iligan City on Mindanao, second largest of the Philippine Islands. It is well located on a deep-water harbor and a principal highway, with a quarry adjacent and a recently completed hydroelectric plant nearby.

Estimated completed cost is in the vicinity of $8 million, and financing is being provided by the Mindanao Portland Cement Corp. with the assistance of a $3.7 million loan from the U. S. Development Loan Fund. The DLF loan is being used for machinery, materials and services.

Turnbull, Inc., engineering firm of Cleveland, Ohio, and Dallas, Texas, is contracted to design the plant, supervise construction and train personnel. Under Turnbull supervision, managerial employes are being trained at various plants throughout the United States.

Fuller Co., Catasauqua, Pa., was awarded the order covering major mechanical and electrical equipment. The $2.5 million order weighed 4,470,000 lb., and was one of the largest shipments of its kind ever cleared through the Philadelphia port. McDonough Construction Co. of Florida is handling the contract covering foundations, buildings, equipment installation, electrical wiring and piping.

Columbia Cement workers cited for safety

Something of a record in safety awards for 1960 has been chalked up by the Zanesville, Ohio, plant of Columbia Cement Corp., wholly-owned subsidiary of Pittsburgh Plate Glass Co.

Heading the impressive list of nine citations were the National Safety Council Award of Honor and the U. S. Bureau of Mines Sentinels of Safety Trophy—the latter presented to the Zanesville plant's Jonathan limestone mine. Other awards included: the Certificate of Achievement from Manufacturing Chemists' Association, Inc.; the Portland Cement Association Award; the Industrial Commission of Ohio Special Achievement Award, Safety Merit Certificate, and 100 Percent Accident Prevention Record Award; Group Safety Award by the Zanesville Industrial Safety Council; and the Certificate of Honor from PPG.

Please turn to page 52

Enter 1409 on Reader Card

"WE'RE PROUD TO SELL EAGLE AGGREGATE PROCESSING EQUIPMENT"

—Fred Woltman, Vice President
Tractor & Equipment Co., Oak Lawn, Ill.

The recent comments of one of our distributors make a better advertisement than we could ever write and we asked permission to reproduce them here.

"We are proud to sell Eagle Aggregate Processing Equipment because it does everything the Eagle Iron Works claims for it and we have a lot of satisfied customers as a result.

"Not many manufacturers go to the trouble that Eagle does to make sound recommendations and to see that their equipment is properly applied—it is a pleasure to work with them. Furthermore, their many years in the business and the hundreds of successful installations to their credit enable them to speak with authority—Eagle does not indulge in guesswork. We can sell their equipment with confidence.

"While many ideas developed and proved in the field by Eagle have been boldly copied by other manufacturers—such as their Water Scalping-Classifying Tank—Eagle offers something that cannot be copied, and that is EXPERIENCE—that only comes with time—with successfully solving all kinds of aggregate processing problems year after year.

"We sold a large Eagle Sand Washing-Dehydrating Classifying Section with an Eagle Log Washer to MATERIAL SERVICE, DIVISION OF GENERAL DYNAMICS CORP., for their floating plant at Morris, Illinois. This highly efficient plant is capable of producing 850 tons per hour of 4 types of specification sand simultaneously, the sweetest material you ever saw. Eagle's engineers and our own teamed up with Material Service engineers to give them what they wanted. We are mighty proud of this plant."

SINCE 1872

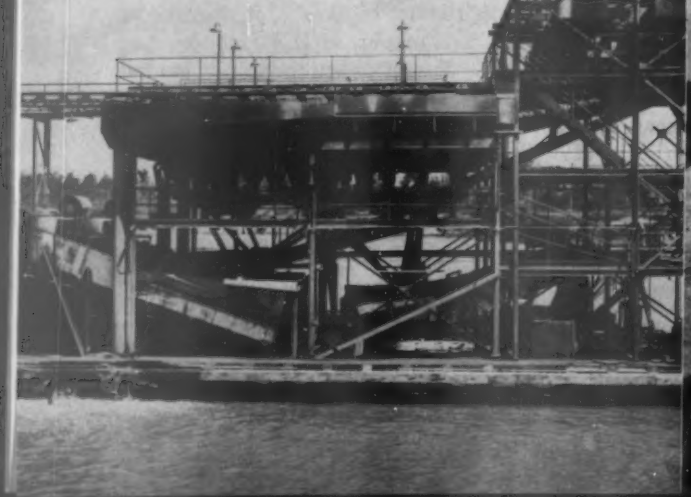
EIW
EAGLE IRON WORKS

EAGLE IRON WORKS

137 HOLCOMB AVE., DES MOINES, IOWA

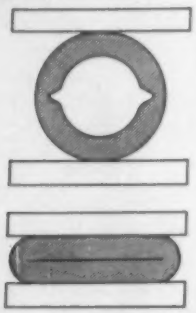
Plant is mounted on 3 barges. The double Eagle Sand Section is on the first barge closest to the dredge. It consists of four 38′ Water Scalping-Classifying Tanks with 11 valves each and four double-screw Washer-Classifier-Dehydrators.

Barge-loads of specification sand—1500 tons per barge—ready for market—every ton economically cleaned and classified by the Eagle floating Sand Section. Send for Catalog describing Eagle Sand Processing Equipment in detail.

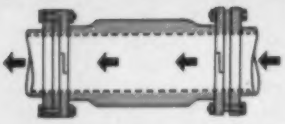


Massco-Grigsby
PINCH VALVES

"Hinged" sleeve permits tight closing reduces wear.



Recesses in sleeve serve as "hinges" during compression.



Unobstructed flow eliminates high friction loss; and there are no metal parts in contact with pulp or liquid.

Several types of closing mechanisms are available, from handwheel to motorized.

Automated Systems. Completely automatic systems may be coordinated and interlocked with other plant equipment.

1" to 14" I.D.; pressures to 150 psi; temperatures to 200° F.

WRITE FOR CATALOG 609

MINE AND SMELTER SUPPLY CO.

3800 RACE STREET • DENVER, COLORADO
OFFICES AND AGENTS IN PRINCIPAL CITIES

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Industry News

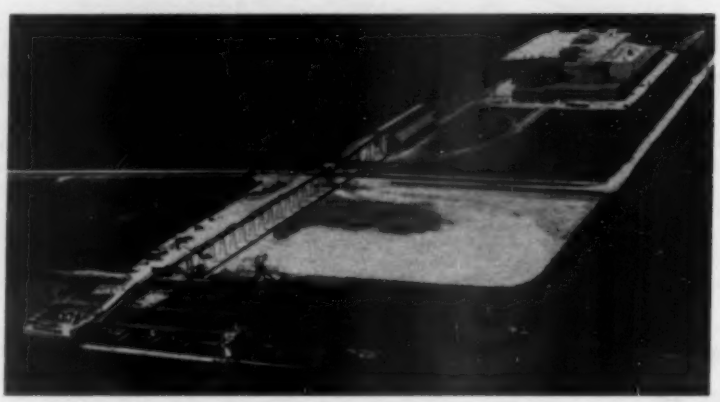
continued from page 50

Concrete company sold to Ore-Lite Industries, Inc.

On his retirement, President S. Carl Smithwick, Smithwick Concrete Products, Portland, Ore., announced the sale of his company to newly-incorporated Ore-Lite Industries. The transaction includes the Portland headquarters, block plants in Portland and Eugene, and a lightweight expanded shale (Haydite) plant near Vernonia. Taking over as president of the new enterprise is Paul L. Nutt, who for the past eight years held the position of vice president and sales manager of the Smithwick firm.

Mr. Smithwick has served many facets of the industry, and will continue in several offices. He was founder and president of the Expanded Shale Institute, and is editor of its official journal, Concrete Facts. He is a director and past president of the National Concrete Masonry Association. He also had been district engineer for the PCA.

New Orleans Tidewater plant for Bestwall Gypsum



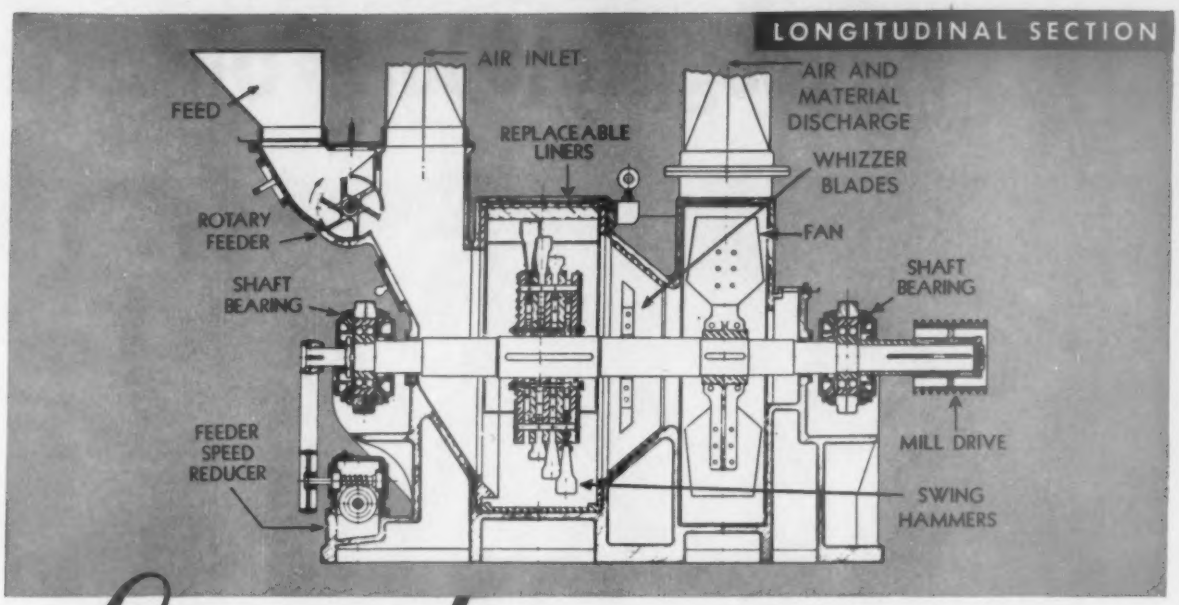
A $6.6 million plant began operations September 1 for Bestwall Gypsum Co. It is something of a pioneer in its location, which is on the new Tidewater Ship Channel, a 76-mile waterway linking New Orleans to the Gulf of Mexico.

When in full swing, the plant will be importing 200,000 tons of gypsum ore annually in ship cargoes ranging from 14,000 to 20,000 tons. From this it will manufacture enough wallboard, lath and sheathing for 30,000 homes per year, as well as wall plasters, graded commercial rock and agricultural gypsum.

Consisting of a plaster mill, packaging center, storage unit, crusher and screen mills, transfer towers, laboratories and offices, and shipping and warehousing departments, the Bestwall plant is located on a 50-acre site adjacent to the new bulk handling facility of the Port of New Orleans. In charge of operations is Manager A. E. Edmondson.

The Tidewater Ship Channel is scheduled to be navigable by 1963. This $101 million project, being built by the U. S. Army Corps of Engineers in cooperation with the Board of Commissioners of the Port of New Orleans, will slice 40 miles off the present Mississippi River route to the sea.

Please turn to page 56



Raymond's RUGGED IMP MILL

THE MULTI-PURPOSE GRINDING UNIT

GRINDING • BLENDING • SEPARATING • CONVEYING • DRYING

✳ DESIGNED FOR FINE GRINDING

The Imp Mill is particularly intended for medium fine and fine grinding of softer non-metallic minerals and many manufactured products. Wide usage of the Imp Mill is made in a great many fields where pulverizing is desired.

✳ VERSATILITY OF APPLICATION

Mills are built in a variety of types and sizes to produce many different capacity requirements. They have a wide degree of adjustment of product fineness, ranging from about 20 mesh to 325 mesh, depending upon material handled.

✳ NEED OF CLASSIFIER

For higher finenesses or more uniform finished products than the Imp Mill would normally produce, an air classifier may be used. Either an integral Whizzer Separator or a Raymond Mechanical Air Separator could be installed according to the particular type of operation needed and the material to be processed.

✳ FLASH DRYING

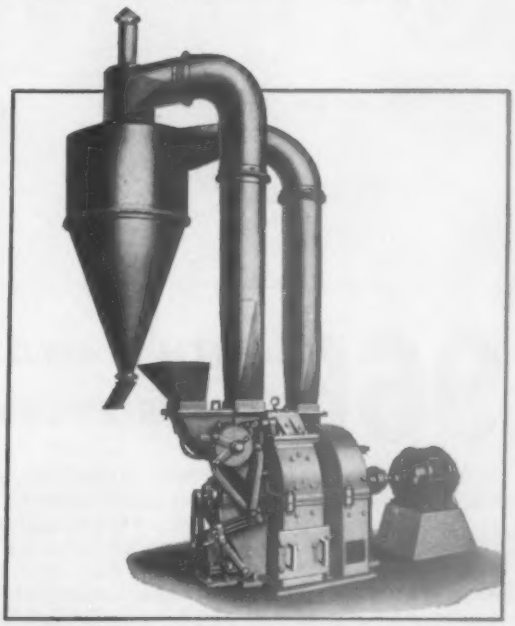
The basic design of the Imp Mill readily adapts itself to the simultaneous drying and pulverizing of materials. The Mill utilizes heated air or products of combustion for removing surface moisture and, in special cases, chemically combined water from materials during grinding. In all instances air is used as the conveying medium.

✳ FLEXIBLE IN INSTALLATION

Each Mill System is a compact installation, engineered to fit most any plan or layout. The floor space is held to minimum requirements of Mill and Drive Motor. Piping variations permit cyclone collector, within limits, to discharge material where needed. Systems are completely enclosed from feed hopper to finish bin.

✳ DUSTLESS OPERATION

The excess air is diverted to a secondary collector or, where permissible, can be exhausted to the atmosphere.



FOR FURTHER DETAILS ON THIS AUTOMATIC UNIT WRITE FOR RAYMOND IMP MILL CATALOG NUMBER 87

COMBUSTION ENGINEERING, INC.

Raymond Division

Combustion Engineering-Superheater Ltd.
Montreal, Quebec, Canada

427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

Sales Offices in all Principal Cities

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Two Aggregate Plant Owners

966 WITH A 4-YD. LIGHT MATERIAL BUCKET LOADS 25% FASTER, WORKS MORE STOCKPILES

CRUSHED ROCK PRODUCTS, INC., Schenectady, N. Y., wanted a dependable, big-capacity wheel loader for their two-shifts-a-day limestone plant. They bought a new 140 HP* Cat 966 Wheel Loader. Results? "It's doing better than we had hoped," says Plant Supt. Carl Alger. "Production's up 25% over our elevating bucket loader, and the 966 can run from one stockpile to another in a hurry."

Alger's satisfaction is no surprise. Other plant owners report low-cost high production is routine with the 966 because Cat power shift transmission, automatic bucket positioners and power-boosted steering and brakes do all of the heavy work, make the operator's job easier. Fast cycle time is maintained from the beginning to the end of each shift.

Power shift gives him instant shifting, forward and reverse, first and second speeds. Dual ratio steering, exclusive on the 966, boosts production too. In work range the operator can make a full turn with only a half whirl of the steering wheel—makes speedy loading cycles easy; for fast travel between stockpiles, or on the highway, the travel range gives safe, automotive steering response.

Production—good; availability—good; and how about maintenance? Operator Jim Galusha reports everyday maintenance takes only five to ten minutes. He adds that it's easy to climb on and off the wide-open 966—a handy feature when you're on and off a machine all day long. "Visibility," he says, "is excellent even with the big 4-yd. special bucket."

Report on Cat Wheel Loaders

944 FEEDS HOPPER—600-FT. ROUND TRIP IN 57 SECONDS—LOADS TRUCKS, DOES UTILITY WORK

BURBANK ROCK COMPANY, Ponca City, Oklahoma, needed a fast-moving general-purpose wheel loader to feed their screening-washing system and load out finished product. Their Caterpillar Dealer recommended the 944 with a 2-yd. bucket. Leo York, plant superintendent, reports they use the 944 about half the time to charge a hopper with ½-in. limestone chips for screening and washing. The rest of the day the 944 loads trucks from stockpiles, moves equipment around the plant and does general maintenance work.

The 944's profile tells you it's the machine to handle many jobs. Bucket lift arms and cylinders are forward, giving the 944 the reach and lift for easy loading of hoppers, trucks or railroad cars. Operators push the 944 hard, too, because they're not bothered by mechanisms raising and lowering beside them. Never have to worry about a load spilling back on them, either.

The 944 is powered by a thrifty, 105 flywheel horsepower turbocharged Cat Diesel Engine, with a gasoline engine optional. The same option applies to the 80 HP* 922.

One common equipment requirement of aggregate plant operators is machine endurance. You want low-cost, long-time, fast production without maintenance headaches. That's why more and more plant operators rely on Cat Wheel Loaders. If you need a powerful loader with fast wheel mobility and a wide range of bucket sizes, check with your Caterpillar Dealer. He'll solve your loading problems for a long time to come.

*All horsepower specifications are flywheel ratings.

CATERPILLAR

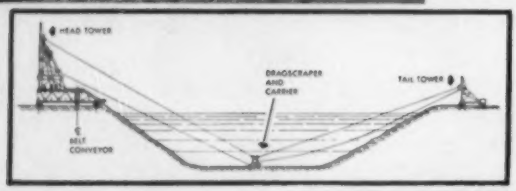
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

Tough Digging, Long Hauls... Routine Jobs for Sauerman DragScrapers

240-Ft. Bank... 350-Ft. Haul

This mobile Sauerman Tower Excavator digs 480 yds. per hr. on an average haul of 350 ft. from a high bank to a portable field hopper. The 12-yd. Crescent DragScraper operates between steel head and tail towers. The towers are mounted on two sets of railroad tracks and ride on four sets of trucks. DragScraper power is supplied by two hoists mounted on the head tower. One hoist operates the load and pull-back cables, the other is used to tension the track cable. The hoists are controlled by one operator located in the cab on the tower. The load cable handles over 400,000 tons of material before replacement.



Drawing shows typical mobile tower excavator digging in wet pit.

75 Ft. Under Water... 800-Ft. Span

A 5-yd. rapid-shifting DragScraper supplies about 200 yds. per hr. to the plant hopper in background. Bridle tower in foreground is one of two supporting the bridle shifting cable which is controlled by the third drum of the Sauerman hoist. Lateral shifting of the DragScraper's line of operation is readily accomplished by power-shifting the trolley and tail block to a new position on the bridle cable. The DragScraper is digging 75 ft. under water and the operating span is 800 ft. from head frame to the bridle towers. Over a million tons have been excavated from this pit. The DragScraper often operates 24 hrs. a day to handle contract demands.

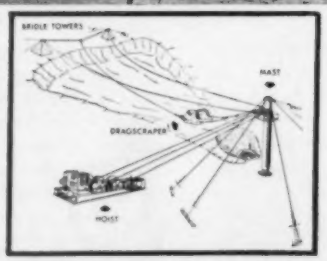


Diagram shows details of Sauerman rapid-shifting DragScraper.

Sauerman machines dig and haul in one continuous operation... work on high bank, dry pit or under water... handle most bulk materials. Consult Sauerman engineers about your job. We will promptly supply appropriate literature.

SAUERMAN BROS., INC. 630 SO. 28th AVE. BELLWOOD, ILL.
LIndon 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Tautline Cableways • Duralite Blocks

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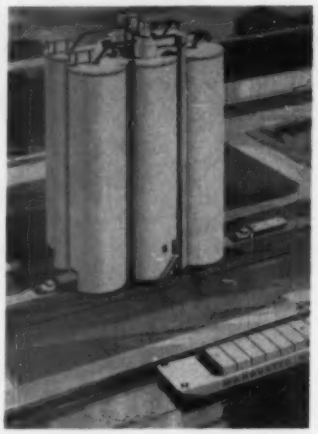
Industry News

continued from page 52



East, midwest get 62,000-bbl. Marquette plants

By November 1, Marquette Cement Manufacturing Co. will have in operation a 62,000-bbl. storage and distribution plant located in the Waukegan, Ill., harbor. Initially the plant will consist of three 143-ft. silos, packing plant, and the most up-to-date loading facilities. Later plant capacity will be doubled by adding a duplicate bank of silos. Cement is transported by barge from Marquette's Oglesby, Ill., plant.

Similar facilities should be completed one month later on the west bank of the Providence River, Providence, R.I. There Marquette's subsidiary, North American Cement Corp., will sell cement produced at Catskill, N.Y., and brought to the new plant by ocean-going vessels.

Soil-cement testing-- in sound and color

The Portland Cement Association has just released a 16-mm. film entitled "Standard Laboratory Control of Soil-Cement Mixtures." This film describes, in sound and color, the standard ASTM-AASHO testing procedures, as well as the latest short-cut tests used with sandy soils.

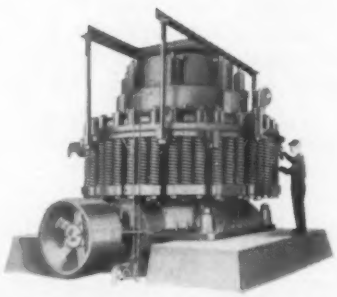
Please turn to page 59

Dolomite

the "building blocks" of progress

When Nature adds magnesium to limestone, the result is *dolomite*. In the form of crushed aggregate, it is used for road building, in concrete dams and other engineered construction projects. As crystalline dolomite marble, it is used as ornamental building stone. And because of its magnesia content, it is widely used in making refractories for open-hearth furnaces and Bessemer converters. Found in massive beds throughout the world, dolomitic limestones are truly the building blocks of progress.

In processing this rock-mineral, Symons Cone Crushers have again maintained their leadership in high capacity, low-cost production of finely crushed product. *For in dolomite as in all important rock and ore crushing operations around the world,* Symons Cone Crushers are first choice of leading producers.



SYMONS® CONE CRUSHERS *. . . The machines that revolutionized crushing practice* . . . are built in a wide range of sizes, for capacities to over 1500 tons per hour. Write for descriptive literature.

SYMONS . . . a registered Nordberg trademark known throughout the world.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG

NORDBERG MACHINERY

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SAN FRANCISCO • TAMPA • WASHINGTON • WICHITA, KAN. • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

Enter 1467 on Reader Card

Their 14th Lorain . . . Another "85A"

H. E. Millard Lime & Stone Company of Palmyra, Pennsylvania, has purchased 14 Lorains over the years to work in its four-level limestone quarry. This new 2½-yard Lorain-85A shovel is the second of this model used for working at the quarry face.

Repeat Lorain ownership like this, on demanding operations like this, proves that Lorains are where the tough jobs are. There are many reasons for this. Here are a few:

"Joy-Stick," Air-Power Control. Finger-tip control of "metered" air power eliminates slam-bang operation. Permits smooth blending of motions. Saves the operator. Saves the machine. Lowers costs.

Shear-Ball® Connection. Like a huge ball bearing, this holds the turntable to the crawler, provides smooth, rock-steady swing and eliminates the constant maintenance, adjustment and lubrication problems of other types of connections. Saves time. Saves man-hours. Saves costs. Carries a 10-year warranty.

Additional Features. A stable, rugged crawler with independent travel, with two speeds in both directions is fully controlled by air power. Three-shaft turntable design gives flexible operation such as simultaneous hoist, swing, and travel. All-welded, box-section shovel boom or square-tubular-chord crane boom provide rugged front ends.

There are many more reasons why you should use Lorains. Get the whole story from your nearby Lorain shovel-crane distributor. Call him today.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

DOES MORE FASTER—FOR LESS

PLANTS in Lorain and Elyria, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler from ⅜- to 2½-yard capacity · Cranes from 7 to 80 tons . . . on crawlers, and as rubber tire Moto-Cranes, and Self-Propelled Cranes · Rubber tire front-end Moto-Loaders in 6,000-lb., 7,000-lb., and 9,000-lb. operating capacities.

OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

Enter 1411 on Reader Card

continued from page 56

Recent Highway Act figures include matching funds

The U. S. Bureau of Public Roads has released a table indicating the size of the expanded Federal-Aid Highway Program —one that includes the matching funds put up by the states.

Millions of dollars

Fiscal year	Federal funds	State matching	Total
1961	2,673	1,070	3,743
1962	3,074	1,110	4,184
1963	3,325	1,190	4,515
1964	3,550	1,230	4,780
1965	3,650	1,250	4,900
1966	3,775	1,280	5,055
1967	3,875	1,290	5,165
1968	4,000	1,330	5,330
1969	4,000	1,330	5,330
1970	4,000	1,330	5,330
1971	3,885	1,320	5,205
	39,807	13,730	53,537

Mexico, Mo., home of Kaiser technical center

An ultra-modern technical center for the purpose of developing and processing fireclay, silica and high alumina refractory brick has been established by Kaiser Refractories at Mexico, Mo. It was dedicated this Fall to employes, customers, and to the founders of the Mexico Refractories Co., which was merged with Kaiser in 1959.

The 17,300-sq. ft. center contains offices, meeting room, general lab building, and a testing furnace building. Laboratory and offices are faced with salmon-colored brick and aluminum panels; most of the remainder is concrete block.

Raw materials preparation apparatus and equipment for forming refractories enable plant processes to be simulated, although pilot production runs are made in the plant. The furnace building permits all standard testing procedures. The laboratory contains areas for grinding, sizing and material preparation, clay and container storage, a physical testing area, and a humidity and temperature controlled laboratory for special testing. The Kaiser center is also headquarters for the Missouri area of the Mining and Minerals Investigation Department.

Both this facility and Kaiser Refractories' Milpitas, Calif., laboratory are under the administration of Director of Research James C. Hicks.

Please turn to page 61

SYMONS®

"Type F"

HORIZONTAL VIBRATING SCREENS

...FIRST CHOICE FOR DEPENDABLE ASPHALT PLANT SERVICE

Most asphalt plant builders use Symons Screens.

A Symons Type F Double Deck Screen will make from two to four-bin bituminous mix specifications. An added intermediate or drop deck will serve for very fine mixes or five-bin plants without increasing the minimum headroom requirements of the horizontal deck unit.

If your plant lacks capacity or ability to meet specifications at low cost, ask us how a Symons Screen can solve your problem.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD.

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NORDBERG MANUFACTURING CO. Milwaukee 1, Wisconsin

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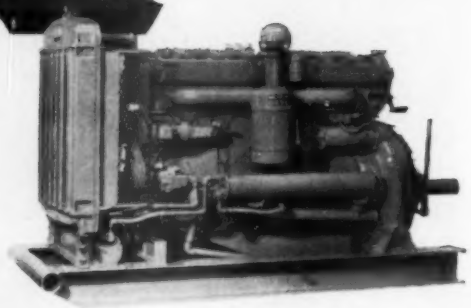
Two letters to remember in diesel engines and generator sets...

MP

THE SERIES

MURPHY DIESELS



Here's the **MP** *Series Line-up*

MP SERIES ENGINES AND POWER UNITS—105 HP to 420 HP, 1200 and 1400 RPM.

MP SERIES DUAL FUEL ENGINES—147 to 242 HP.

MP SERIES GENERATOR SETS—70 KW to 227 KW.

MP SERIES MECH-ELEC UNITS for delivering mechanical or electrical power separately or simultaneously.

MP SERIES MARINE ENGINES AND AUXILIARIES—105 HP to 420 HP.

The 48-page booklet entitled "Before You Power a Job . . ." gives detailed information on MP Series Murphy Diesels. Ask your Murphy Diesel Dealer for a copy, or write direct. There's no obligation.

Deliver More Power Into the Job to Make More Profit for You

The power put into the job—not the power on the job, is the power that pays off for you. Engine reaction to load changes and speed changes determines the power that actually goes into the job. Only an engine with high rising torque can put more power into the job when needed.

MP Series Murphy Diesel engines are designed and built to deliver More Power into the job—the kind of *usable, hard-working power* you need. With high rising torque, they have the ability to take hold of a load and really hang on. This helps keep your equipment at the right operating speed for efficient production and More Profit. And remember, each day's production is determined by the *total power* put into the job that day.

To put MP Series Murphy power in your job, put Murphys on your job. You'll see the difference in your profits. Ask your Murphy Diesel Dealer for full information on the MP Series today.

MURPHY DIESEL COMPANY

5315 W. BURNHAM ST., MILWAUKEE 19, WISCONSIN

MURPHY DIESEL

433-RO

Sales, service and parts throughout the nation

Enter 1436 on Reader Card

Industry News

continued from page 59

Sand screening, settling booklets are available

Two booklets on sand preparation that were originally published as a service to ROCK PRODUCTS readers are still available and may be had by writing this magazine. Nathan C. Rockwood's "Screening Fine Materials," copyrighted in 1946, is an authoritative discussion of determining factors in the operating efficiency of vibrating screens.

Another volume, "Fundamentals Principles of Sand Settling," (copyright 1929 and 1943) was written by the late Edmund Shaw as a practical guide to commercial sand producers. A limited number of these standard references still on hand will be given to individuals requesting them.

$7.5 million expansion for thriving Arkansas plant

Arkansas Cement Corp. of Foreman, Ark., is giving this small agricultural community that houses it a shot in the arm. A $7.5-million expansion program is underway, which will raise annual capacity to 2.8 million bbl. and bring the total investment in the plant to $21 million. In addition, 60 to 70 employes will find permanent work. Approximately one year will be needed for construction.

Tulsa gets new stone plant

The Tulsa (Okla.) Rock Co. is starting business with a $1.5-million crushed stone plant. The plant, located on 550 acres across the tracks from the new Dewey Portland Cement Co. operation, has a capacity of 300 tph. Its President, Jack Schaller, was formerly affiliated with American-Marietta Co.

Please turn to page 64

Will Never Owe You Anything!

Your OWEN Clamshell Bucket starts making money for you from the first hefty mouthful it bites off . . . and keeps on making money because its rugged construction "stands up". It's the bucket with "The Big Bite that's Just Right!"

The OWEN has a strong appetite for work—an appetite that is never satisfied. These are exclusive features that keep it working for you:

Block and Tackle Type Reeving — **Recessed Lips**
One-piece Head Construction — **Single Main Shaft**
Riveted Bowl Assembly

Prompt service through ample inventory on new equipment and parts.

Write for OWEN information on how these features can make money for you.

The OWEN
BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida

Enter 1454 on Reader Card

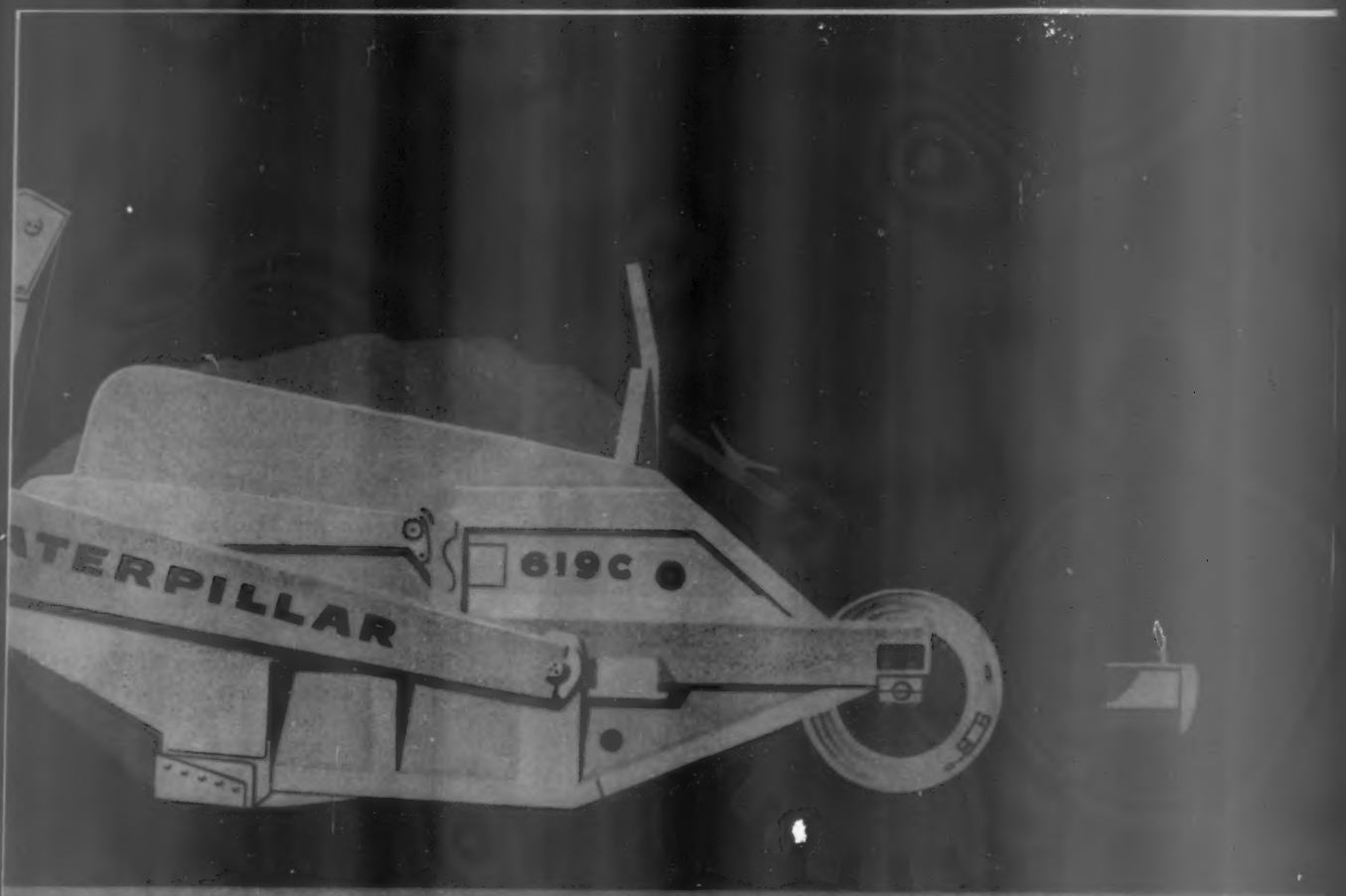
NEW, IMPROVED CAT 619...SERIES C...ALL NEW 4-CYLINDER ENGINE... 24% MORE HORSEPOWER...COMPACT...ECONOMICAL...CHOICE OF POWER SHIFT TRANSMISSION, DIRECT DRIVE...COMPLETE UNIT CONSTRUCTION...EASY SERVICING...NEW TIRE SIZE...AIR ACTUATED, LIVE POWER CABLE CONTROL...IMPROVED 18 YD. (14 YD. STRUCK) SCRAPER.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

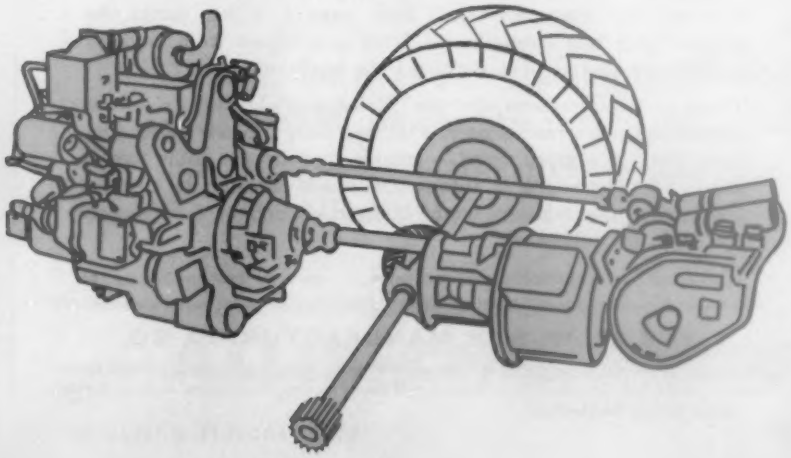
ADVANCED AS TOMORROW —CERTAIN AS YESTERDAY



New 280 HP 619C offers choice of power shift transmission for faster, easier operation or direct drive transmission. Air actuated, live power cable control reduces operator effort. New, bigger 26.5 x 29 (22 ply) tires improve roadability. Top speed: 30 MPH. Capacity of matching Lowbowl scraper: 18 cu. yd. heaped, 14 cu. yd. struck. Also available: 25 ton PR619 Rear Dump Trailer built by Athey Products Corp.

New power shift transmission provides 9 speeds forward with just 3 shifts. One lever gives operator instant selection of 3 speed ranges . . . dial indicator tells him **when** to shift. Within each speed range, transmission **automatically** shifts to torque divider drive, direct drive or overdrive to match job conditions. The 619C with power shift transmission always operates at the right speed and power for the job at hand.

New, more powerful Cat D340 Engine (280 HP maximum, 250 HP flywheel at 1900 RPM). This economical 4-cylinder engine burns No. 2 fuel oil . . . has parallel-ported dual intake and exhaust valves and overhead camshafts for most efficient operation . . . has pressure ratio controlled turbocharger and aftercooler. Swingaway dash and pivoted crankcase guard simplify servicing. Unit construction assures easy servicing: engine, transmission, planetary final drives can be removed without disturbing adjacent components.



Check the Advantages of Dynaclone® Dust Filters

SINCE 1870 SLY

1930's
SLY TUBE-TYPE FILTER
Dust load was concentrated at certain points, causing premature tube failure.

TODAY
SLY "ROLL-CLEAN" DYNACLONE:
Dust is spread evenly over the entire cloth area.

See Us at the
CHEMICAL SHOW
Booth 73

2 TO 3 TIMES LONGER FILTER BAG LIFE

Three factors play a part in longer Dynaclone filter bag life — as proved on the most demanding applications. (1) Dynaclone construction and low air-velocity design insure even distribution of dust. (2) "Resist-O-Wear" bags have 3-section design for greater basic bag strength. (3) Dust is removed from bags by reverse cleaning air. No shaking — no abrasion.

There are other reasons why the "Roll-Clean" Dynaclone sets an unmatched performance pace. Flat bag design means 20 to 40% more cloth in a given space — greater capacity per cubic foot of filter. The Dynaclone is automatically self-cleaning. It operates continuously, provides constant uniform suction at dust sources for complete collection.

Check *all* the Dynaclone advantages . . . ***Send for 36-Page Catalog 104.***

"Roll-Clean" Dynaclone: Patents 2,867,289, 2,938,598. "Resist-O-Wear" Filter Bags: Patent 2,959,247.

THE W. W. SLY MANUFACTURING CO.

4746 Train Avenue, • Cleveland 1, Ohio • Offices in Principal Cities • Overseas Licensees: Andrew Air Conditioning Ltd, London S. W. 1, England • Mideco Pty. Ltd., Nunawading, Victoria, Australia

Enter 1450 on Reader Card

Industry News

continued from page 61

Railroad study may lead to freight hauling revolution

Thirty-five railroads are collaborating on a revolutionary new method for hauling heavy volumes of a single commodity between two points. The study, conducted by the consulting engineering firm of Theodore J. Kauffeld, New York City, will initially concern the transportation of coal to major bulk consumers, but can easily apply to stone, cement and many other commodities.

In the unique new train, high-capacity cars, designed specifically for the product to be hauled, would be semi-permanently coupled, and diesel units located throughout the train would be controlled from cabs on either end. Thus there would be no need for time-consuming turning or switching, or for intermediate handling and classification of cars. Approximately 25,000 tons would be hauled from source to user in one operation, interrupted only to change crews, and the train would be ready to return almost immediately.

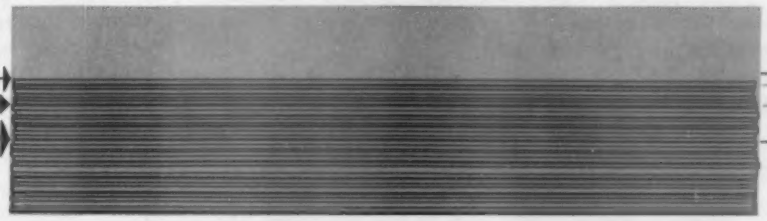
A leasing corporation would probably own the trains, so that they could operate over many connecting railroads as do individual cars today.

Canadian outfits to offer premixed pozzolan

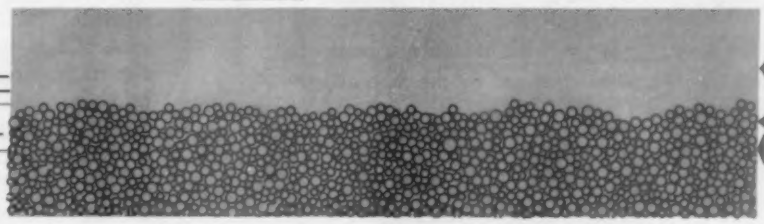
A pozzolan cement of controlled quality, available in premixed form, is in the planning at two Vancouver, B.C., companies. Shale for the new product is produced at the Saturna Island plant of B.C. Lightweight Aggregates, Ltd. (See ROCK PRODUCTS, Nov. 1960, p. 80) It is then shipped to B.C. Cement's Bramberton plant, to be blended into four different types of pozzolan cement.

Please turn to page 66

Allis-Chalmers rod mills

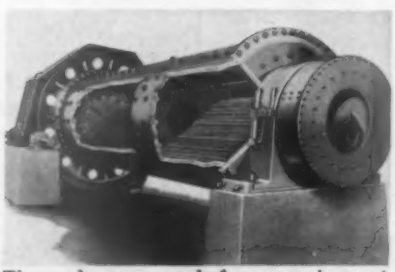


require less labor and power



to grind a more uniform product

for better rotary kiln feed



The modern approach for preparing wet kiln feed in open circuit. The first compartment contains rods to closely size the material for following ball compartment.

Allis-Chalmers engineers and builds rod mills, *Ballpeb* compartment-type ball mills, and *Rodpeb* combination rod-and-ball mills. Write to Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Ballpeb and *Rodpeb* are Allis-Chalmers trademarks. A-1554

ALLIS-CHALMERS

Enter 1483 on Reader Card

FROM CONSTRUCTION WORK TO URANIUM MINING

"Bonded Buy used Cat equipment has always given me first-rate service," says GARN MOODY

Garn Moody has capitalized on his working knowledge of heavy equipment to branch out into a number of successful business operations. From his initial start in contracting, he has put his reliable spread of used Cat-built equipment to work in the non-allied fields of farming and, since late 1958, a thriving strip-mining operation in the rugged country near Delta, Utah.

"When you're moving into an unfamiliar new field, you've got to have smart crews and dependable equipment," says Garn Moody. "My used Cat-built rigs have always given me good steady production. We've worked our two D8s and two DW20s 8 to 10 hours a day since we bought them two years ago. The work is rough, but down time has been light."

Garn has purchased all three types of used equipment his Caterpillar Dealer offers: Bonded Buy, Certified Buy and Buy and Try. "In each case," he says, "the deal worked out fine for me. I'll buy under the same contracts any time. Dependability from Bonded Buy machines is like buying a new machine."

Success is never a sure thing, but if you're expanding your operations and trying to keep your equipment outlay on a budget basis—without sacrificing reliability—check your Caterpillar Dealer's protected purchase plans.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BEST BUYS IN NEW AND USED EQUIPMENT

Enter 1452 on Reader Card

Industry News

continued from page 64

Washington outfits merge into Associated Sand & Gravel

Associated Sand & Gravel Co., Inc., Everett, Wash., has been formed through merger of Everett Paving Co., Everett Development Co., Skagit Valley Paving Co., and Associated Sand & Gravel Co. Officers are: George P. Duecy, president; Howard F. Sievers, executive vice president; Wallace H. Ross, secretary, and Edward J. Basse, treasurer. No changes in personnel are presently contemplated.

This company is widely diversified in its products and services, but is perhaps best known for its concrete pipe and precast and prestressed units. The latter will be displayed with exceptional effectiveness in the Federal Exhibit Buildings at the Century 21 Exposition in Seattle.

Concrete cracks under study

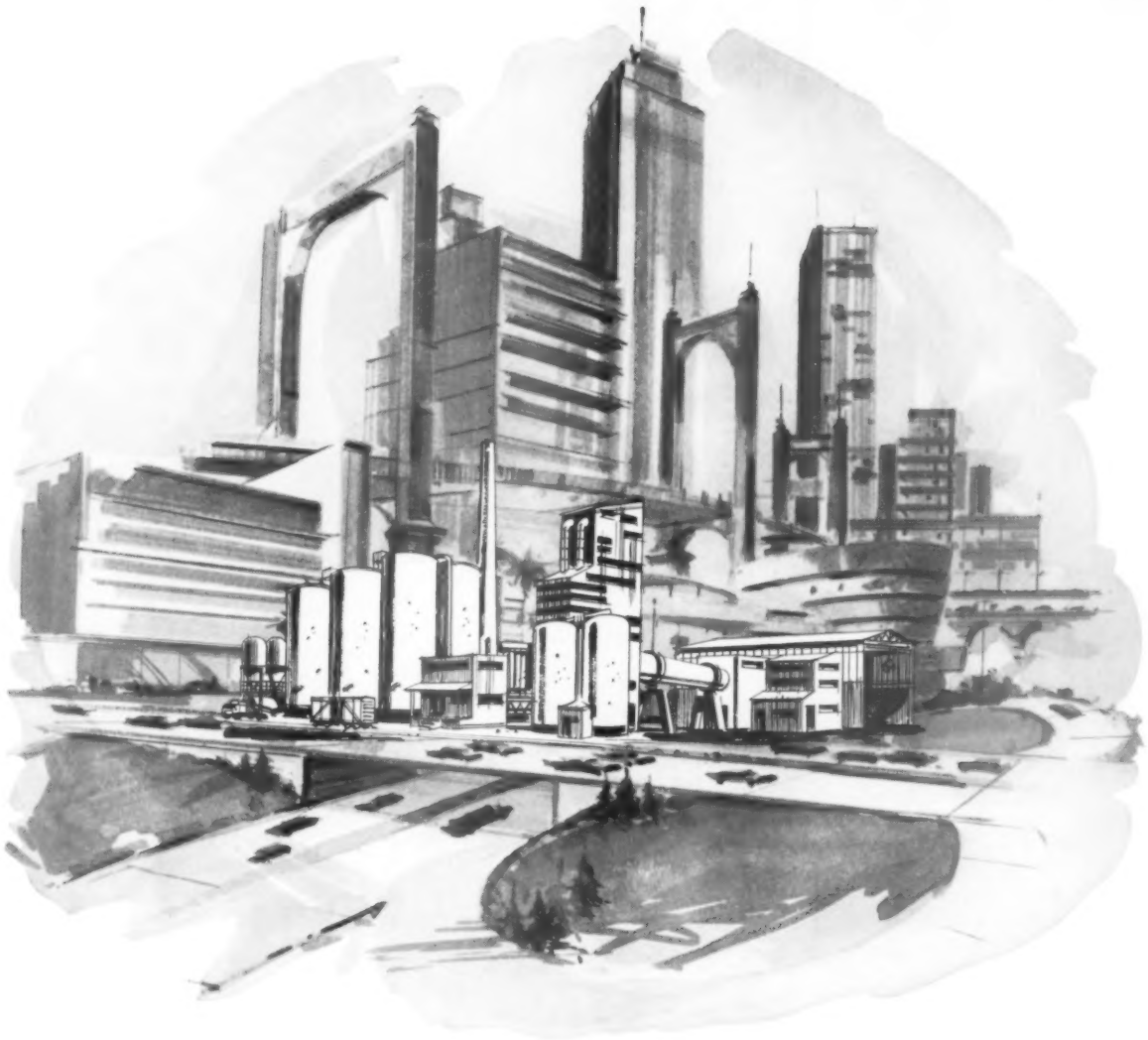
The Portland Cement Association has released its Research Department Bulletin 122, "A Cement-Aggregate Reaction that Occurs with Certain Sand-Gravel Aggregates," by William Lerch.

This bulletin contains a rundown of research on the expansion and map cracking that occurs in concrete made with certain aggregates in the Kansas-Nebraska area.

Phosphates abound in Peru

One of the largest phosphate deposits in the world, estimated at 400 million tons of rock at 9 percent phosphate, has been discovered in the Sechura Desert of the Lambayeque and Piura Departments of Peru. Cia. de Minerales Industriales del Peru has spent about $500,000 during the past few years in exploring the western part of the desert.

Please turn to page 71



Feeding the roots of progress in the cement industry

Cement—the matrix of world construction—is in the USA a 1.3 billion dollar industry. Continuing technological advances keep this basic industry efficient, competitive and responsive to changing requirements in building and construction. Fuller Company, whose pneumatic materials handling and process equipment figures in a wide range of industries, plays an important role here.

In more than 35 years of growing *with* the industry, Fuller has pioneered manufacturing innovations now standard in the field . . . techniques and equipment that have influenced vast improvements in the design of entire cement-producing plants. In these years Fuller has built an ***integrated*** organization—Dracco Division, Traylor Engineering & Manufacturing Division, Sutorbilt Corporation and Lehigh Fan and Blower Division. They are combined to provide the cement industry everywhere with advanced research, with the design and manufacture of equipment for crushing, grinding, preheating, burning, cooling, blending, heat transfer, conveying, dust collection and process control. Fuller is now able to undertake contracts for complete new plants for cement manufacturing and for the modernization of older ones.

Fuller is more than ever qualified today to help cement producers keep cement competitive in prices and quality with existing alternate materials and those to come. For more details on Fuller's capabilities, write today.

2880
G-245

See Pit & Quarry Handbook for details and specifications

Fuller

FULLER COMPANY • 102 BRIDGE ST. • CATASAUQUA, PA.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION • OFFICES IN PRINCIPAL CITIES
FULLER DIVISIONS:
Dracco • Lehigh Fan & Blower • Traylor Engineering & Manufacturing • Sutorbilt Corporation

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FOOD FOR THOUGHT

. . . IN SOLID ROCK!

Don't try to eat this "food"! The steak is petrified wood, potatoes are quartz, cauliflower is howlite, rolls are sandstone concretions. The prunes are obsidian nodules, the avocado is agate, and the cheesecake is satin spar on onyx.

This dinner of rocks is part of a collection of Mrs. Erna Clark, Redlands, California, who, like any aggregate producer, has hunted for suitable rock all over the country. The difference between Mrs. Clark's hobby and your business is that *you* need crushing, mixing or paving equipment that makes *your* rock collection fatten your bankroll!

Think about your equipment . . . your competition . . .

YOUR PROFIT'S AT STEAK!

Whether you spell it steak or stake, profit is the meat of your business. Getting on the gravy train depends on equipment that can handle the job economically — on what your competition is doing — and on YOU.

Years ago a customer in Texas wrote, "I wish you'd quit selling Commanders to contractors in my neighborhood. The only real competition I have around here is other Cedarapids plants."

Chew that over awhile. Then digest this thought . . .

Throughout the years, Cedarapids owners have learned by experience that Cedarapids equipment out-produces and out-economizes any other. Know why? Because Cedarapids has always been first in developing and introducing equipment that meets increasingly difficult requirements with increased production and no beefs about maintenance.

When you own Cedarapids equipment you are three to five years ahead of your competition in low-cost production. And you are the one who keeps eating high on the hog with the greatest profit.

THAT'S FOOD FOR THOUGHT!

Cedarapids

Built by IOWA

Portable Aggregate Plants and tandem crusher plant design were born at Cedarapids, and put big-capacity crushing on wheels for mobility to move with the job and bring profitable production to the job site. With this lead in the race to give contractors ever better, more productive equipment, Iowa Manufacturing Co. researched and engineered, developed and improved crushing plant design to its present unequaled Cedarapids standard of efficiency and economy.

Cedarapids Twin Jaw Crushers have been giving contractors 40% to 100% greater primary crushing capacity for the past seventeen years . . . years of extra profits for Twin Jaw owners! This time-proved unit is stepping up output in Super Commander Plants (above) and other Cedarapids models. Now, the two-movable-jaw principle is no longer a Cedarapids exclusive. Other equipment manufacturers are following our lead, while Cedarapids engineers are working on revolutionary products for the future.

Cedarapids Horizontal Vibrating Screens have been first choice in the industry for 25 years, because horizontal screen design gives 12½% more effective screening area, 30% higher capacity, and much greater accuracy in grading specification sizes. After profit-conscious contractors began to expect the advantages of better screen performance in portable as well as stationary plants, which only horizontal screens could give, other equipment manufacturers again followed our lead.

Bituminous Mixing Plant all-automatic design with true weight proportioning is the result of experience gained since 1946 when Cedarapids first equipped batch-type plants with semi-automatic controls for faster, better bituminous mixing. Cedarapids was also first to cut between-job delays with a 100% portable and self-erecting batch-type plant. Though other manufacturers have followed, Cedarapids still leads in the many other profit-proved batching, mixing and drying advantages that assure extra batches per hour for extra earnings per year.

Cedarapids Bituminous Pavers brought another profit-first to paving contractors. The Cedarapids Paver is the only such machine that lays inspector-accepted mat at 102 fpm; the only paver with a high frequency vibrating screed; the only paver so automatic it almost operates itself. And maintenance costs are exceptionally low. When you own a Cedarapids Paver, your only competiton is another Cedarapids owner . . . and you'll have this profitable advantage until Cedarapids patents run out and other manufacturers can follow our lead.

INS 19

PRINTED IN U.S.A.

IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa

have earned customer acceptance

More than a million tons of Sheffield Grinding Balls of all kinds have proved their worth, throughout the world. This record of performance is no accident. It's the result of tight, quality control of alloying, heat-treating and forging — every step of the way. Sheffield Moly-Cop Balls keep their sphericity longer, give a better, more uniform grind, at the lowest possible cost per ton. No wonder Sheffield Grinding Balls are the standard of comparison, around the world. **Sheffield Division, Armco Steel Corporation, Sheffield Station, Kansas City 25, Mo.**

SHEFFIELD
MOLY-COP
Grinding Balls

ARMCO Sheffield Division

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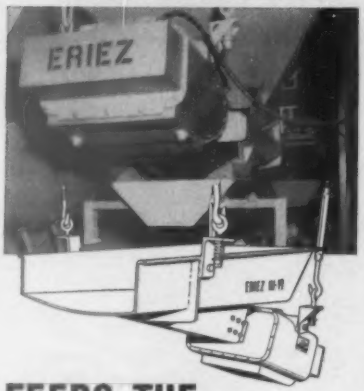
ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.



FEEDS THE BIG STUFF WITH ACCURATE CONTROL

PATENTED

AC powered Eriez Hi-Vi Vibratory Feeders move large tonnages of bulk materials with accurate control . . . more efficiently and economically. Illustration shows one of a number of Eriez units available for heavy feeding applications where **big capacity and accuracy** are essential.

Whatever your application, there is an Eriez electro-permanent magnetic feeder that will meet your exact needs. And you get this exclusive combination of advantages: No rectifier needed . . . AC operation. Totally enclosed drive element ideal for hazardous, dusty, wet and corrosive installations. New fibre glass springs assure superior performance and control . . . longer life because spring breakage is practically eliminated.

The full line of Eriez Hi-Vi vibratory feeders includes models with feeding capacities ranging from ounces to many tons per hour.

Write for descriptive bulletin to:

ERIEZ MANUFACTURING CO.
202XA Magnet Dr., Erie, Pa.
Eriez of Canada Ltd., P.O. Box 5, Sta. W-Toronto, Ont.

MAGNA-THOUGHT

Constant research, development and refinement are the keys to new and improved products. New and improved products are the keys to a company's growth.

A. F. ISRAELSON
Chief Engineer

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 1476 on Reader Card

Industry News

continued from page 66

Asbestos-asphalt test results published

Research Report 60-5 "Asbestos Admixture in Asphalt Concrete," has been made available by Johns-Manville, Asbestos Fiber Division, Manville, N.J. It documents a test project made by the Bureau of Physical Research, N.Y. State Department of Public Works, in which three asbestos-asphalt strips were laid on the Scajaquada Creek Expressway. They are described and analyzed as to materials, methods, field observations and laboratory tests. Background material is included on highway design and on the characteristics of asbestos that make it a valuable additive for asphalt mixes.

President's Island site for cement storage plant

A $500,000 cement distribution plant is being erected by Arkansas Cement Corp. on President's Island in the Memphis, Tenn., harbor industrial area. Four silos will hold 50,000 bbl. of cement produced at the Foreman, Ark., plant, enabling the company to supply markets in eastern Arkansas, western Tennessee and northern Mississippi.

Cleaner Air Week to be celebrated, Oct. 22-28

The Air Pollution Control Association, Pittsburgh, Pa., is sponsoring the nation's 13th annual Cleaner Air Week, October 22-28. Realizing that air pollution is everybody's problem, and one that only teamwork can solve, the Association is encouraging local committees to promote public understanding and cooperation under the direction of APCA Cleaner Air Week Committee Chairman Charles Howison, Cincinnati.

END

ERIEZ Magnetic Minute

60 seconds that will help you improve operating efficiency.

PATENTED

How much will an ERIEZ PERMANENT MAGNETIC PULLEY save you?

Erium® powered Eriez magnetic pulleys save one firm $1200 a year by removing 50 pounds of tramp iron a week from coarse clay. They can save you as much—or more, depending on your application.

In addition to preventing machinery damage, Eriez permanent magnetic pulleys prevent fires and explosions; assure product quality.

The pulley illustrated is one of 192 sizes (up to 36" diameter in any belt width) made by Eriez. **There is one for your exact application.** Two basic models are available: **Type AA,** ideal for separating small and medium tramp iron and fine ferrous contamination; **Type CR,** which performs best in removing large pieces of tramp iron.

All models are engineered and constructed to give you the finest in automatic separation. All are powered by Erium®—our exclusively-designed power source. Model for model, Eriez units give you the finest quality and consistency of magnetic strength.

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202XB Magnet Dr., Erie, Pa.
Eriez of Canada Ltd., P.O. Box 5, Sta. W-Toronto, Ont.

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E. J. TENPAS
Supervisor,
Magnetic Engineering

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A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

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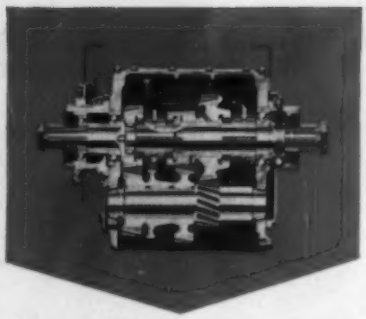

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CALENDAR

of coming events

1961

October 16-21, 1961—National Safety Council, Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

December 7-8, 1961—Missouri Limestone Producers Association, Annual Meeting, Governor Hotel, Jefferson City, Missouri

1962

January 12-13, 1962—Expanded Clay & Shale Association, Annual Meeting, Miami Beach, Fla.

January 15-19, 1962—National Limestone Institute, Inc., Meetings, Roney Plaza Hotel, Miami Beach, Fla.

February 5-9, 1962—American Society for Testing Materials, Committee Week, Sheraton-Dallas and Statler-Hilton Hotels, Dallas, Texas

February 5-9, 1962—National Sand and Gravel Association —National Ready Mixed Concrete Association, 32nd Annual Convention and Biennial Show, McCormick Place Exposition Center and Conrad Hilton Hotel, Chicago, Ill.

February 11-15, 1962—National Crushed Stone Association, Annual Meeting & Exhibition, Conrad Hilton Hotel, Chicago, Ill.

February 18-22, 1962—American Institute of Mining Engineers, 91st Annual Meeting, Statler Hotel, N.Y.C.

April 3-5, 1962—American Institute of Electrical Engineers, Cement Industry Technical Conference, Chase Hotel, St. Louis, Mo.

April 12-14, 1962—Pacific Southwest Minerals Industry Conference (AIME), Palace Hotel, San Francisco, Calif.

May 3-5, 1962—Fifth Rock Mechanics Symposium, jointly sponsored by the mining departments of Colorado School of Mines, Missouri School of Mines and Metallurgy, Pennsylvania State University and University of Minnesota; held at University of Minnesota Institute of Technology, Minneapolis, Minn.

June 18-21, 1962—National Limestone Institute, 17th Annual Convention, Statler-Hilton Hotel, Washington, D.C.

THEY LAST LONGER!

—America's Quality Pillow Blocks

For 37 years Dodge Pillow Blocks with Timken Bearings have been proving their superiority under extreme service conditions in *all* kinds of applications throughout industry.

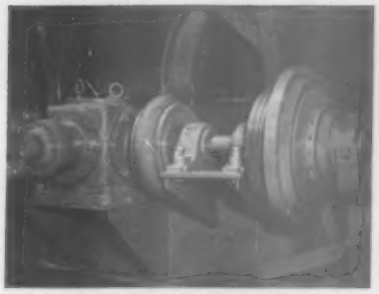
They are noted for their ruggedness. They are built to outlast the demands of the jobs on which they are used. And they carry their loads—radial and thrust, or any combination of the two—with minimum attention.

Dodge takes no chances with the fine precision built into these pillow blocks. They are painstakingly assembled, expertly adjusted, pre-lubricated and SEALED at the factory. You slip them onto your shaft in mint condition—and they stay that way!

There are 5 types of Dodge Pillow Blocks with Timken Bearings—Type E, Double Interlock, Type C (all with shaft sizes from 1-7/16″ to 4-15/16″, and down to 1-3/16″ in Type E), Special Duty with shaft sizes to 12″ and All-Steel—2-15/16″ to 10″. Available from your Dodge Distributor's stock. Call him, or write us for technical bulletin.

Dodge Manufacturing Corporation, 2600 Union St., Mishawaka, Ind.

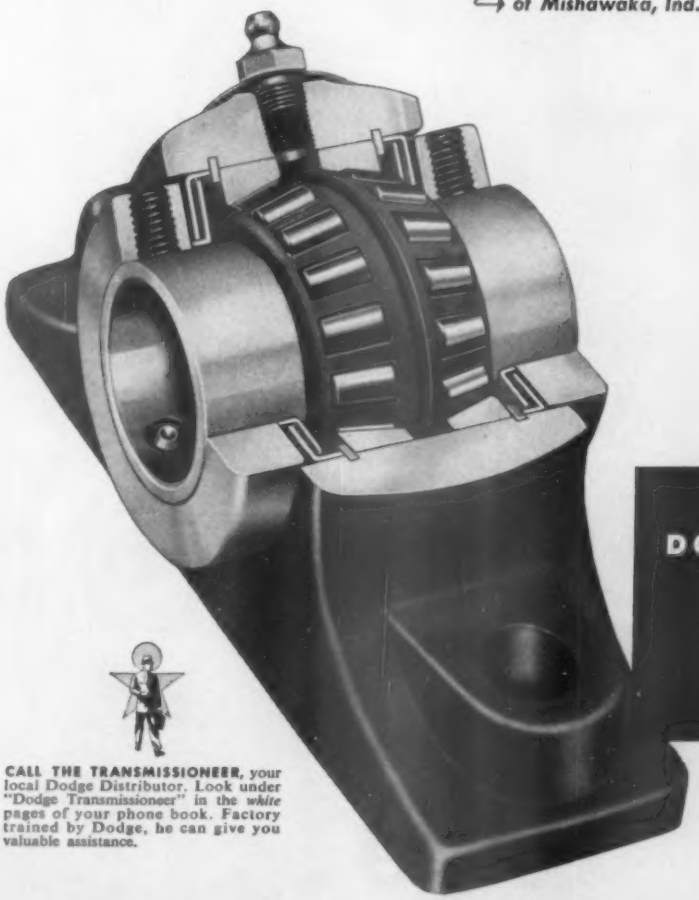
The Products with the Pluses... **DODGE** *of Mishawaka, Ind.*



Dodge Type E Pillow Blocks with Timken Bearings used for the drive hook-up of a rotary percussion drill.

Dodge Type C Pillow Block with Timken Bearings in cement plant — one of 4 in use on elevators since 1930.

Dodge Special Duty Pillow Blocks with Timken Bearings used on a skip hoist bull wheel for a blast furnace.



DODGE PILLOW BLOCKS with TIMKEN BEARINGS

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

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B.F.GOODRICH TIRES MOVE ROCK FILL FOR COUGAR DAM.
Finished dam will tower 485 feet, stretch 1,600 feet, and slope from a base width of 1,500 feet to a crest width of 40 feet.
Six-mile reservoir will provide water resources for flood control, power production and public recreation. $50-million project is scheduled to take four years.

30 TONS OF ROCK CRASH onto B.F.Goodrich Rock Service tires. Tires work two shifts a day on scrapers, bottom dumps, rear dumps, water wagons, graders, rollers and mobile cranes. Yet it's not unusual for tires to be retreaded twice.

CONTINUOUS TIRE INSPECTIONS play a key role in keeping M-C&S' equipment on the go. The B.F.Goodrich Unified Contractors Program helps contractors save on all their rubber products—and protective clothing—requirements. Ask your BFG dealer to show you how this new program can help *you*.

B.F.Goodrich helps move a mountain to build a dam

B.F.GOODRICH ON-THE-SPOT SERVICE helps M-C&S get the most out of equipment. Tire changes seldom take longer than 15 minutes. BFG Servicemobiles carry all the latest power tools, are manned by tire experts.

12-MILLION CUBIC YARDS OF ROCK AND EARTH FILL RIDE TO $50-MILLION COUGAR DAM PROJECT ON B.F.GOODRICH TIRES

They're changing the topography of Oregon's Willamette Valley. Rock quarried from a knob high above the South Fork McKenzie River is taxied down a tortuous road by a fleet of giant earth movers. It will become part of the fill for Cougar Dam, a Corps of Engineers flood control project that will be the largest structure of its type in the Northwest.

Altogether, general contractor Merritt-Chapman & Scott Corp. will move 12-million cubic yards—every one on B.F.Goodrich tires. You'll find B.F.Goodrich Rock Service tires with Cut Protected compound hard at work here. BFG developed this compound for jobs like Cougar Dam, where upwards of 30-ton loads must be carried over hard, rock-surfaced roads. It takes a mighty big boulder to gash this compound, and if it should, there's BFG Flex-Rite Nylon cord construction to withstand the impact (and resist heat blowouts and flex breaks too). No wonder many Rock Service tires at Cougar Dam can be retreaded twice.

B.F.Goodrich on-the-job service plays a key role in keeping M-C&S equipment on the go. All 600 BFG tires are inspected regularly. Tire changes seldom take longer than 15 minutes. There is a BFG tire warehouse and shop less than a mile from the project. A BFG tire record system keeps the contractor informed of costs and helps control inventory.

Supplying contractors with longer-wearing tires and dollar-saving service is an everyday job for B.F.Goodrich. On many projects B.F.Goodrich supplies everything from tires to boots to belts through its new Unified Contractors Program. Whatever *your* need, it will pay you to talk to your B.F.Goodrich dealer. His know-how can make a big difference in your profit picture. Look him up under Tires in the Yellow Pages. *The B.F.Goodrich Company, Akron 18, Ohio.*

Specify **B.F.Goodrich Tubeless or tube-type tires when ordering new equipment**

B.F.Goodrich

HINTS & HELPS

Profit-making ideas developed by operating men

Dust handling system

Many rock products producers have found that dust handling can cause material handling problems far out of proportion to the volume or value of the dust. Even a few pounds an hour calls for expensive or bulky conveyors that may or may not prevent the fines from escaping and becoming air-borne.

A Chicago-area rock products producer has installed a vibrating conveyor to gather dust from a battery of cyclone collectors. Flexible chutes are securely fastened to spouts and to the cover of the conveyor. The conveyor cover itself has been sealed with gaskets and clamps. In order to clear a rotary valve, the conveyor has been "bent" without disturbing the seals or reducing its conveying capacity.

Traveling skirt boards

A midwestern crushed stone plant has installed a novel, but, apparently, very effective method of keeping material within skirt boards on belt feeders. It consists of a D-section V-belt mounted so that it rests on the surface of the belt and travels at the same speed. Positioned under the chute, it is a substitute for the stationary skirt boards that have been known to cut grooves in the surface of the conveyor belt.

This particular producer is fortunate to have a rather large supply of V-belts discarded from the drive of his secondary crushers. His major expense has been for the single-groove sheaves in which the belt on each side of the feed hopper runs. (Photo shows only one traveling skirt board in place)

Service recording devices

Maintenance men in rock products plants and time study engineers have found that recording devices on trucks are invaluable tools. Charts in the instruments make a permanent record of the working and idling time of each truck. When an individual truck has done its quota of hard work, it can be sent to the shop for normal lubrication and maintenance. Standby trucks or idle equipment will not get unnecessary attention when a record is kept of their activities. When this record is correlated with records of tire wear and engine replacements, it is possible to pinpoint defective or inadequate materials and to take steps to study the performance of the parts more carefully.

Water trucks for dust

A great many producers have found that water trucks are very useful to lay the dust on driveways and haulage roads. But on hot dry days with plenty of traffic, an ordinary spray truck can't always keep up with the dust. When this happens, a midwestern crushed stone producer presses one of his delivery trucks into dust service. He fills the body of the truck with water; then the truck drives slowly around the plant. Since the tail gate is not completely watertight, it dribbles a healthy stream of water over the roadways. Where the spray truck can't keep up with the dust, this technique never fails!

Gates for "separate contractors"

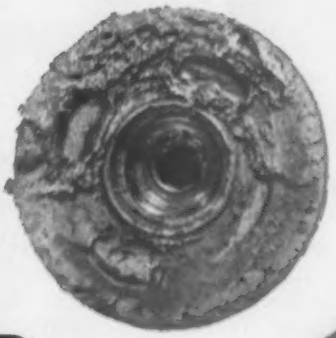
A number of rock products producers around the country have gone to the trouble and expense of building a new roadway and new entrance gates for delivery trucks. By doing this, they hope to get around the effects of any "blackmail" or secondary boycott picketing.

With separate gates for delivery trucks and for production employees, labor difficulties with one group or the other will not now close down the plant.

Please turn to page 78

OUTSIDE—covered with an abrasive sintered iron ore mix, dust and dirt.

INSIDE—completely free of contamination! Still full of grease.



STILL TURNING FREE AND EASY

after 4 rugged years ...without regreasing

Sinter plant test installation proves SEALED-IN RELIABILITY of Link-Belt idlers

This is only one of several Link-Belt standard production idlers that have logged 31,616 hours of service in four years at a steel mill. Others are still operating. When removed, this idler had made 364,216,320 revolutions, handled 11,065,600 tons of sintered iron ore mix . . . one of the most abrasive compounds known to industry. And it did it with the *original factory grease*. Link-Belt welded shut the grease fittings to prevent regreasing.

Where competitive makes failed after two years with regular regreasing, Link-Belt idlers were still turning free and easy. Disassembly revealed that the abrasive sinter mix had only begun to penetrate the outer portion of the felt-neoprene contact seal. It still had a long way to go through the grease filled multi-labyrinth seal to get to the bearing. Shafts showed no scoring. Bearings measured only a few microns wear. Thanks to Link-Belt's *exclusive* cartridge seal. And there was no apparent loss of grease from reservoir.

Here's proof of the long-lasting dependability you can expect from Link-Belt idlers. This test was so convincing that customer now specifies Link-Belt idlers *without* provision for regreasing. For further details, contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under CONVEYORS in the yellow pages of your telephone directory. Ask for Belt Conveyor Idler Book 2816. 15,735

LINK-BELT

BELT CONVEYOR IDLERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World.

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Hints & Helps

continued from page 76

Watch for fire hazards

A number of rock products producers have discovered that it is possible to have costly fires. Fires have been known to burn out grease pits, painted structural steel, wooden sidings on steel structures and conveyor belts. And while the damage has not been catastrophic, concrete foundations have been weakened, structures have been warped, and conveyors misaligned.

Even some of the most cautious producers have had serious fires resulting from a burned out motor or a welder's carelessness. One answer is to provide enough of the proper kind of fire extinguishers in particularly hazardous locations. Another way is to tap washing water lines to make sure that water, at least, is available to protect buildings and conveyors.

When one producer had a small electrical fire, he was amazed to discover that a simple fire extinguisher baffled the worker who attempted to use it. As a result, everyone in that plant has now been thoroughly instructed how to put out fires of all kinds. But why wait to have a fire?

Left-hand driving

Some time ago we reported that western cement producers had set up left-hand driving rules to keep loaded quarry trucks next to the hill and away from the cliff side of the road. This technique is often used for side-dumping trucks to speed up their dumping cycle. A midwestern aggregates producer has found that it also speeds up the dump cycle for his end-dump trucks. By keeping always on the left-hand side of the road, English style, the trucks may be routed so that they never cross each other's path. This system not only speeds up the trucks, but has dispensed with several flagmen to control the flow of traffic.

Automatic lubricator

An eastern aggregates producer rigged up an automatic lubricator for an exposed chain drive. A small valve in the oil supply line opens only when the chain-driven conveyor is operating and gravity keeps a constant flow of oil through a wick to the chain. The oil is kept in a clear plastic container so that a maintenance man can easily see if more oil is needed.

END

Screen Story...

A battery of four 4' x 10' Three-Pocket "Step" Washing Screens helps Pacific Clay Products turn out a high quality glass sand at Camanche, California. In this difficult, high-abrasion service with a large percentage of oversize in the feed, Overstrom Vibrating Screens get maximum life from expensive 30-mesh slotted cloth while efficiently removing undersize.

Better plants producing better products with *Overstrom Vibrating Screens* — that's a familiar scene in the non-metallic minerals industry.

With their versatile, time-proven Two-Bearing Cartridge Vibrators, Overstrom screens can operate at high speeds and low amplitudes for fine mesh screening, wet or dry — or at lower speeds and large amplitudes for coarse screening or scalping. Field adjustments of speeds and amplitudes can be quickly made to meet new conditions with peak efficiency. Oil-bath lubrication assures longest bearing life under all conditions of speed and load.

(write for catalog and pictorial case histories)

OVERSTROM VIBRATING SCREENS

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address inquiries to: 2213 West Mission Road, Alhambra, California

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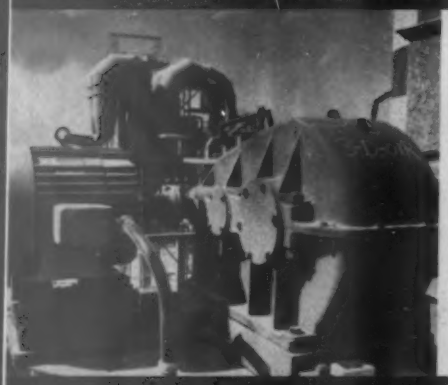
HOW WESTERN GEAR SERVES THE CEMENT INDUSTRY

The Hawaiian Cement Industry is GEARED TO GROW by Western Gear

TWO GIANT STRIDES in the recent growth of the cement industry in Hawaii are shown here in the two newly completed high-capacity modern cement plants. One at Waianae, Oahu, was built for the Permanente Cement Company by Kaiser Engineers. The other at Barber's Point, Oahu, was engineered by the Bechtel Corporation for the Hawaiian Cement Company. Both have one important productive force in common. Both plants are geared to produce with maximum speed, capacity and efficiency with Western Gear Speed Master cement mill drives, speed reducers and gear motors. Check your plant power transmission requirements with Western Gear. For full particulars on how your company can be Geared To Grow, or for product catalogs—address **Western Gear Corporation, Industrial Products Division, P.O. Box 126, Belmont, Calif. • LYtel 3-7611.**

WG INDUSTRIAL PRODUCTS DIVISION

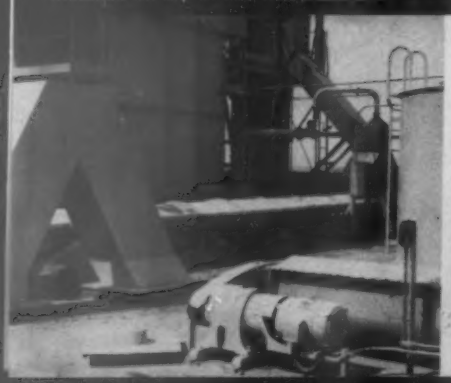
SpeedMaster speed reducer ahead of bucket elevator carrying raw feed to kiln.



StraitLine gearmotors driving screw conveyors which withdraw and blend finish cement.

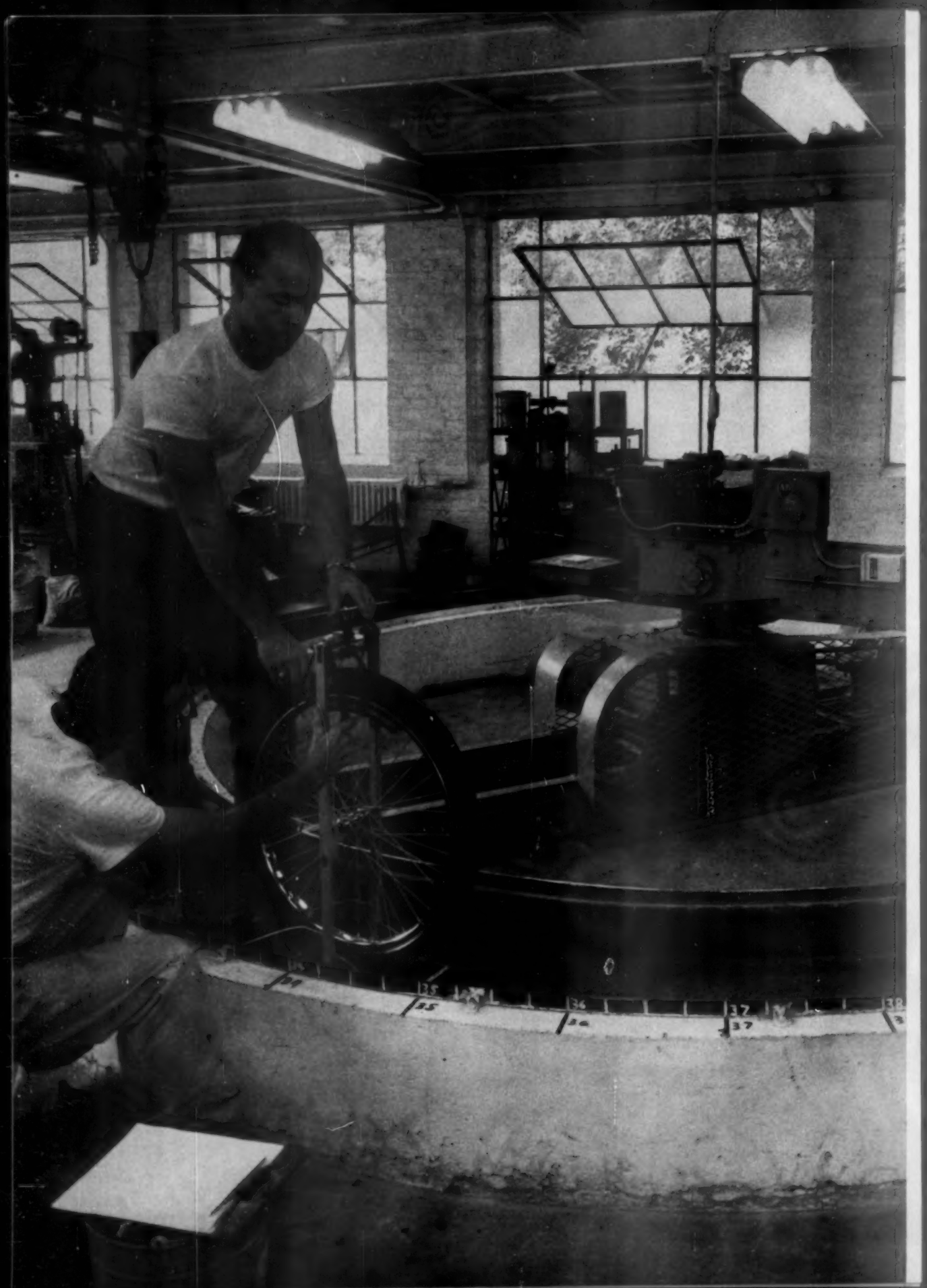
StraitLine gearmotors driving screw conveyors at blending and homogenizing silos.

StraitLine gearmotor screw conveyor drive installed on top of raw materials silo.



SpeedMaster reducer induced draft fan drive at the rear of the precipitator.

StraitLine gearmotor manlift drive.



ROCK PRODUCTS
October 1961

The NCSA Laboratory: Service through Research

by Joseph N. Bell

JOSEPH E. GRAY, engineering director of the National Crushed Stone Association, leaned back reflectively in his office at the NCSA headquarters in Washington, D.C. Choosing his words carefully, he said: "We try to maintain a laboratory that is of real and specific help to Association members. To fulfill this function, we feel it is important and necessary to serve requests of individual members. But we also have to schedule our time and work very carefully so we are performing our other, and equally important, function—that is, research of importance to our entire industry."

Here, in a few sentences, Mr. Gray captured the essence of the working philosophy of the effective and highly respected research program of the National Crushed Stone Association.

This highly workable combination of research and engineering effort has been evolving since the NCSA first established a program of technical assistance more than 35 years ago. The National Crushed Stone Association was organized in 1918 to help the crushed stone industry deal with emergency problems created by World War I. In 1925, the headquarters were moved from Columbus, Ohio, to Washington, D.C., and a Bureau of Engineering was established; three years later, a research laboratory was added. In 1947, the Association purchased its own building in the nation's capital, and the laboratories were installed in their present quarters—a spacious ground-floor area which has been enlarged several times and still offers possibilities for some further expansion.

During the past five years, the NCSA research and engineering staff has undertaken more than 250 distinct projects, ranging from simple Deval abrasion tests to investigations of the utmost complexity. For one project involving cement-aggregate reaction, the laboratory fabricated 1,100 concrete beams and mortar bars. These specimens were measured periodically to determine growth or expansion; readings for this single investigation totaled more than 12,000.

The laboratory projects can be grouped in three principal categories; research work of a basic nature of benefit to the entire industry; investigations of special problems for individuals or groups of members, and standard tests for members.

"While we try to be letter perfect in the conduct of standard tests, such as abrasion and sound-

Please turn page

Left: This circular track is used by NCSA technicians to test the durability and other qualities of aggregates used in pavement surfaces. It has probably—over the years—been the most used of all NCSA Laboratory equipment

Right: This section of the NCSA Laboratory shows a Deval abrasion machine, Page impactor, diamond saw, core drill and cementing valve machine

The NCSA Laboratory . . .

continued from page 81

ness," says Joseph Gray, "we also experiment with test variables. Furthermore, the laboratory is equipped to perform many tests which are rather unique, yet which provide valuable information about the physical properties of stone and portland cement or bituminous concrete. In the field of standard tests, we are frequently called upon to make cooperative and referee tests—important functions of the NCSA laboratory."

The benefits to the industry resulting from the work at the NCSA can best be explained by citing several specific examples of work that has been taking place in recent years.

Research on Dense Graded Aggregate Bases—"In dense-graded aggregate base course construction there is a large and expanding market for crushed stone," points out Mr. Gray. "Every effort must be made to assure that when these bases are built with crushed stone, they will perform with complete satisfaction as far as materials are concerned. Failure of base courses can be caused by inadequate design, poor methods of construction or use of improper materials. It was the purpose of our investigation to develop information for assuring the best performance for crushed stone."

Research was directed toward answering these questions:

1. What is the effect of maximum size aggregate in mixes of various sizes?
2. What is the effect of plasticity index?
3. What is the effect of minus 200-mesh material on the performance?

Results, thus far, can be summarized as follows:

A. The strength (load-carrying capacity) and rigidity of the base course increased as the maximum size of aggregate increased. The practical application of these indications would be that base courses should be built with the maximum size of aggregate that can be handled and placed without segregation.

B. Base course material with non-plastic fines possessed higher strength and was more rigid than material with plastic fines, especially if the plasticity index was five or more. It is indicated that the lower the plasticity, the better the performance of a base material under conditions of high moisture.

C. With uniformly graded material, the highest strength was obtained with about 8 percent passing No. 200 mesh, which tends to confirm the present practice of several state highway departments of requiring 5 to 12 percent to pass 200 mesh.

Pavement Slipperiness—Another example of an NCSA long-range research program is its continuing study of pavement slipperiness.

With the increase in traffic speed and volume, pavement slipperiness has become a critical problem. While slipperiness may be due to several different factors, certain aggregates tend to polish under the action of tire traffic, resulting in potentially dangerous conditions. The NCSA laboratory has used its circular track to test both portland cement and bituminous concrete surfaces for skid resistance.

One investigation involved the study of various fine aggregates for portland-cement concrete pavement. A total of 56 sections were placed in the track. The fresh concrete surfaces were finished with a burlap drag to roughen them and expose the particles of fine aggregate. In one series of sections, different sizes and types of hard, gritty aggregates were added to the surface of plastic concrete. These surface treatments were applied to obtain a uniform coverage, and then were vibrated into place. After curing, sections were subjected to wear and polishing by the combination action of a rolling truck tire dragging a weighted rubber mat over the surface sprinkled with water and fine sand.

The relative slipperiness was measured by an ingenious bicycle wheel apparatus designed by the Association's engineers. The results of the investigation indicated that the degree of slipperiness is related to the characteristics of the aggregate. Possibly the most significant result was the benefit that could be effected by the incorporation of a relatively small amount of hard aggregate in the surface. Such material—of about ¼ to ⅛ in. size, applied at a rate of about 5 lb. per sq. yd.—provided excellent skid resistance.

Service Testing—Most of the hundreds of individual problems of member companies upon which the NCSA labs have provided help fall into a pattern of two current basic difficulties:

1. A trend toward raising the quality of aggregates required for pavement surfacing and concrete structures;
2. A trend toward greater restriction with respect to tolerances.

A problem which the laboratory has faced has been to have stone from quarries rejected until there was an improvement in its quality. Very careful studies of the quality of stone occuring in the various ledges of these quarries have been made. As a result, it has been able accurately to

locate the good and questionable rock as far as soundness is concerned. In every instance, the elimination of certain ledges has meant a more costly operation.

In some cases, it simply required the raising of the quarry floor which resulted in working a shallow face and leaving a large amount of stone in place; in other cases, it meant selective quarrying with the breaking of one face into as many as three benches and the quarrying and throwing away of 2 to 8 ft. more of stone. The removal of such stone through benching is an operation which definitely increases the cost of production; and yet, competitive conditions prevent any increase in the selling price.

There are several avenues toward the solution of this problem. The approach that apparently holds the most promise is establishment of the level of concrete quality with a given source of aggregate that will assure satisfactory performance. In other words, if an aggregate performs well in pavement concrete, why should not concrete of the same quality be used in other structures to ssure its satisfactory performance? The laboratory staff hopes to conduct some research studies to obtain further detailed data in this direction.

Most state highway departments are today making a much more careful and thorough inspection of materials than ever before. Whenever a limiting number is written into the specifications, building materials must be tested to see that they are in compliance. Furthermore, there is less tendency on the part of highway engineers to overlook lack of compliance with some details of the specifications on the basis of their personal judgment that the departure from the requirement is of little consequence to the performance of the work. Whether an aggregate outside of the specifications in some respects will perform as well or even better than one that meets the specifications, is beside the point. In the present construction climate, the aggregate must comply in all respects with the requirements set forth in the specifications.

For example, in those states where freezing may occur, there is almost always some form of soundness requirement for the aggregate. Also, the grading requirements of aggregate for surface treatment has become one of great concern to some producers because of the procedure used to control or limit the amount of dust.

The old term "coarse aggregate shall be free from flat or elongated pieces" is rapidly giving way to specific limitation. A review of state specifications on allowable flat or elongated pieces shows a rather wide range between 3 and 15 percent of pieces whose greatest dimension is not more than five times the average least dimension.

This compression testing machine has a capacity of 300,000 lb., but can also be set to operate on two lesser load ranges

This automatic freeze-thaw machine provides rapidly repeated cycles of freezing and thawing for testing the durability of concrete specimens

And, finally, the problem of reactive aggregate has again become one of major concern.

These are problems of the industry upon which the staff has been working a large part of the past year and, in all probability, will continue in the years ahead. It stands ready to offer whatever technical assistance it can toward their solution.

Associated with Mr. Gray, is J. R. Boyd, since

Please turn page

The NCSA Laboratory . . .

continued from page 83

1956 the executive director of the NCSA. Mr. Boyd —a graduate engineer—joined the NCSA staff in 1925 and has been handling the administrative affairs of the Association ever since, as secretary, administrative director and, finally, as executive director. Mr. Gray joined the NCSA in 1928, after serving an apprenticeship as a junior engineer with the Bureau of Public Roads. He served as a testing engineer for 15 years and a field engineer for 12 more years. Mr. Gray was then named NCSA's engineering director in 1956—on the retirement of A. T. Goldbeck, who had firmly established the NCSA research program in his 31 years as engineering director. Under Mr. Gray's administration, the NCSA has enlarged both the scope and size of its work. The staff has more than doubled (from four to nine) and is now divided into two divisions (research and service testing).

To perform this work, the NCSA laboratory has acquired—in addition to the basic laboratory devices—several major pieces of research and testing equipment: an automatic freeez-thaw machine, triaxial testing equipment, a circular track for testing pavement surfaces and a compression testing machine. The latter has a capacity of 300,000 lb., but can also be set to operate on two lesser load ranges. The circular track was designed and constructed in 1931 by NCSA technicians to fill an urgent need for a device to test the durability and other qualities of aggregates used in various pavement surfaces. It has an outside diameter of 15 ft. and a circumference of 50 ft.—and over the years has probably been the most valuable single piece of equipment in the NCSA laboratory.

Triaxial testing equipment, the most recent acquisition of the laboratory, has been in almost constant use in researchers on dense-graded aggregate base materials. This equipment is similar to that developed by the Texas State Highway Dept. in its base material evaluation work.

The automatic freeze-thaw machine was purchased in 1954 for use in determining the resistance of concrete specimens to rapidly repeated cycles of freezing and thawing. Durability investigations once requiring up to 18 months can be completed in 6 weeks with the automatic machine. It was manufactured to specifications by the Carrier Div. of the United Clay Products Co.

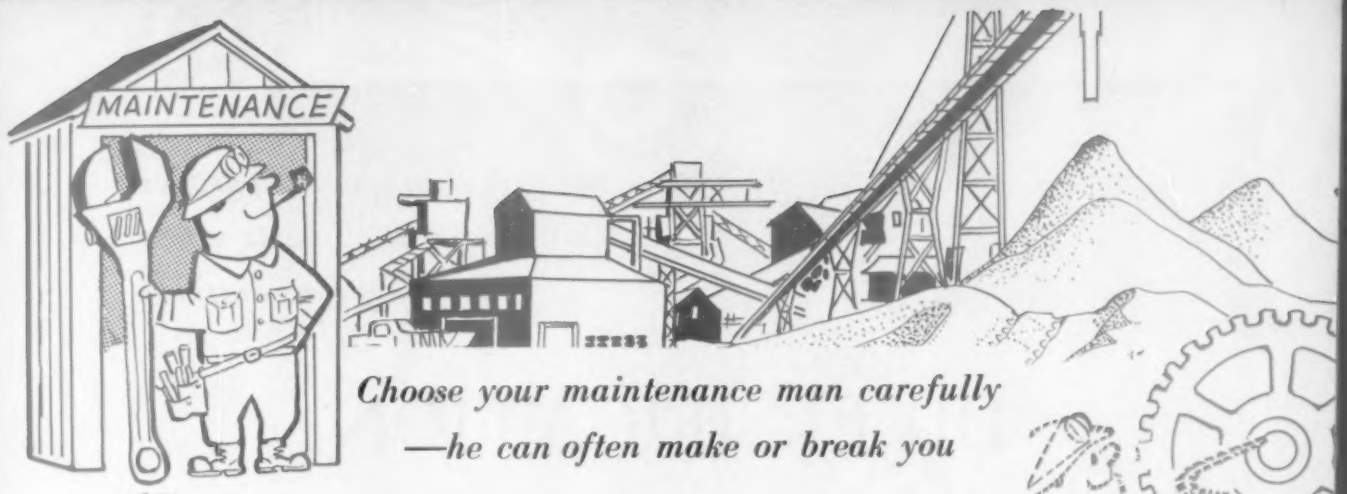
In operation, cold air is circulated by two fans in a clockwise direction up through the cooling coils and down through the compartment containing baskets of beams under test. When the beams have attained the desired low temperature, thawing is accomplished by circulating water at a controlled temperature through the storage compartment. The water enters at the bottom of the chamber and overflows out the back. After completion of the thawing phase, the water is pumped back into the storage tank. The timing of these operations is automatically controlled by adjustable timers.

In addition to testing the durability of specific aggregates, the freezing-and-thawing apparatus is used to determine how the durability of concrete is affected by such factors as degree of saturation of concrete and aggregate, pore characteristics of aggregate, mix proportions and air entrainment.

The NCSA research laboratory is equipped to perform all of the physical tests required to determine the quality of aggregates, investigations on bituminous mixtures, portland cement concrete, railroad ballast, and even such complex investigational work as the determination of the thickness of non-rigid pavement necessary to support specific traffic loads. Much research is done in the development of methods for testing the durability of bituminous pavement mixtures. NCSA concrete investigations have culminated in a method that has gained wide recognition as a useful tool for determining concrete proportions, no matter what might be the gradation, shape of particle or specific gravity of the coarse aggregate. Difficulties in the proportioning of concrete are being overcome through the use of this method.

In addition to these broad, general investigations, special research—often with a broader application—is constantly underway on behalf of individual members. For example, a member may wish to know the best type of bituminous mixture that can be made with his particular materials. Investigations in the NCSA laboratory readily give the answer. Another member may want to know the proportions necessary to produce concrete of a desired strength and workability. A few tests and calculations at the NCSA lab will provide an almost immediate answer based on facts developed from past investigations and, if necessary, special tests. These examples only scratch the surface; there is hardly a field in which crushed stone is used that has not been at least partially investigated at the NCSA labs. The variety of problems encountered in the research work of the Association, all involving crushed stone, is remarkably broad and complex.

The laboratory's primary interest is in seeing that satisfactory performance is obtained with crushed stone. It wants crushed stone used properly in every type of construction. **END**



Choose your maintenance man carefully
—he can often make or break you

How to pick a maintenance man

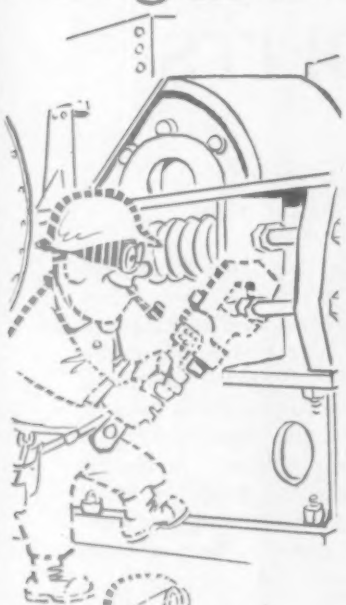
by Ernest W. Fair

FIX-IT TALENT just seems to be born in some people, and if you're lucky you already have such a man in charge of maintenance operations. But if you're searching for good maintenance men—from among your own help or on the outside—here are a few pointers.

The "natural" mechanic prides himself on his ability to improvise urgently needed repairs; to plan ways of substituting when there isn't time to get a new part. He enjoys the challenging and the unexpected. Of course he is exceptionally skillful with tools and conscientious about taking good care of them. Without this special care, tools can become a heavy item of expense.

The calm, dependable man is best suited to maintenance work or supervision, one who remains efficient and composed no matter what emergency arises. There are many occasions when the maintenance man's steady nerves can save both dollars and tempers.

Cleanliness is a basic principle of good maintenance, but stay clear of he man who is exceedingly fussy. He may cause unnecessary delays by stopping to polish every nut and bolt, and often panics completely when faced with a messy emergency job. However, painstaking attention to detail is most important. It is often the small adjustments and minor repairs that keep that huge machinery functioning. *Please turn to page 126*



This sand and gravel producer upgrades his hard, white quartz sands to supply new markets

DIVERSIFICATION LEADS TO EXTRA PROFITS

by John H. Bergstrom

DIVERSIFICATION is the keynote of this sand and gravel producer's business. Chevereaux Sand & Gravel Co. of Auburn, Calif., has an unusual deposit of aggregates and is making the most of it by branching out into industrial silica. With both milky white quartz and a dead-black material, owner Joe Chevereaux already prepares concrete aggregates, aggregates for exposed panels and landscaping aggregates (See ROCK PRODUCTS, Nov. 1959, p. 110 for description).

Now sand blast sand as well as aquarium sand have been added to the list of products made in the plant. Material for sand blasting is produced from the white, high-silica sands that make up nearly three-quarters of the deposit in the Bear River. The small but steady demand for aquarium sand takes black as well as white sand.

Chevereaux's Bear River deposit has some of the best sand and gravel in the state. There is about 70 percent sand with very little plus 4-in. gravel. The entire deposit is either pure black or pure white. The black material, which is in the minority, is about 70 percent silica while the white quartz is almost pure silica.

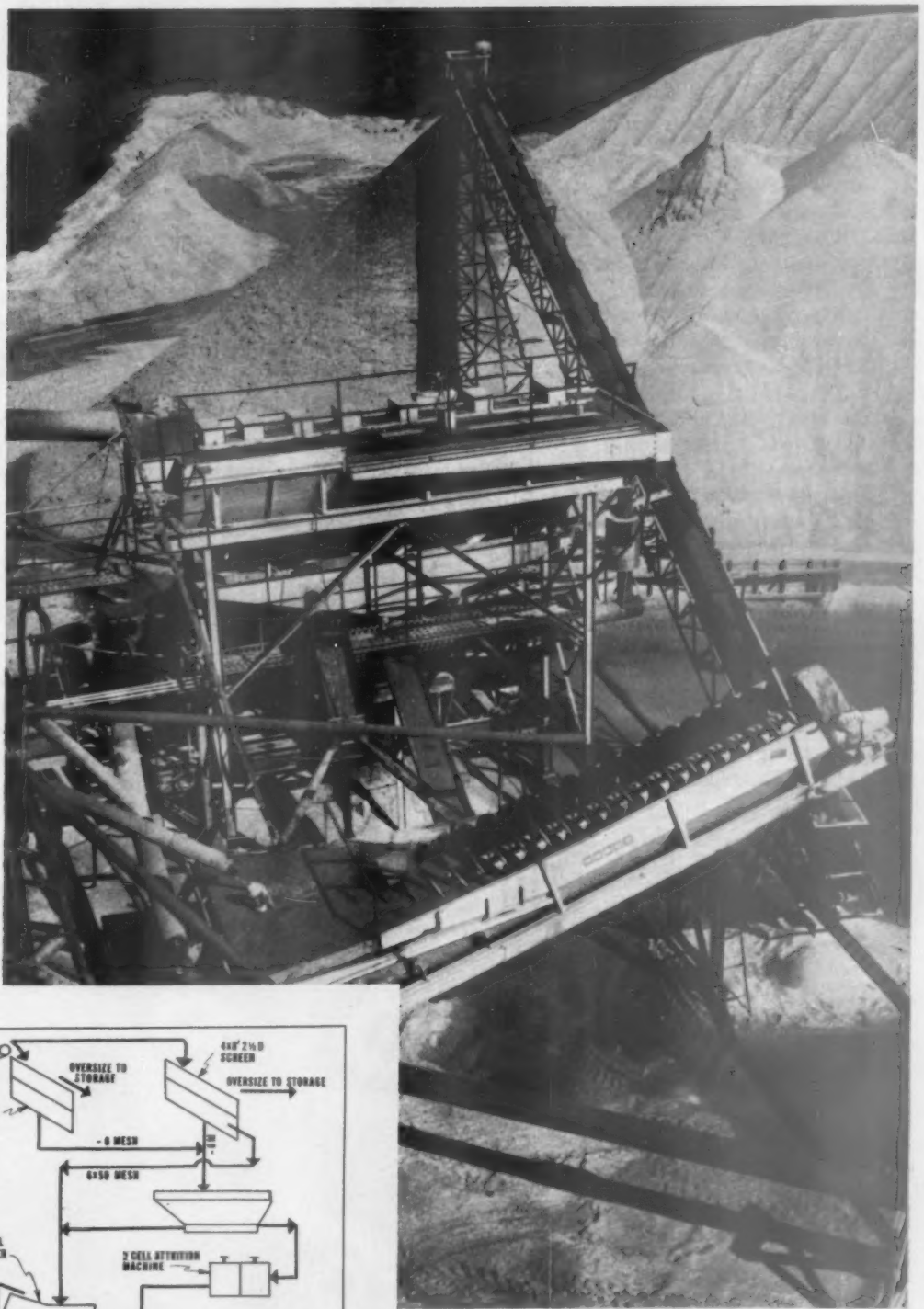
In addition to having some of the hardest sands in the area, the Chevereaux deposit is also one of the cleanest. "It should be," says Joe Chevereaux, "By the time we get it, it's already been washed twice. Once, when it was hydraulicked out of the hills nearly a century ago, and a second time as it traveled 20 miles downstream to us."

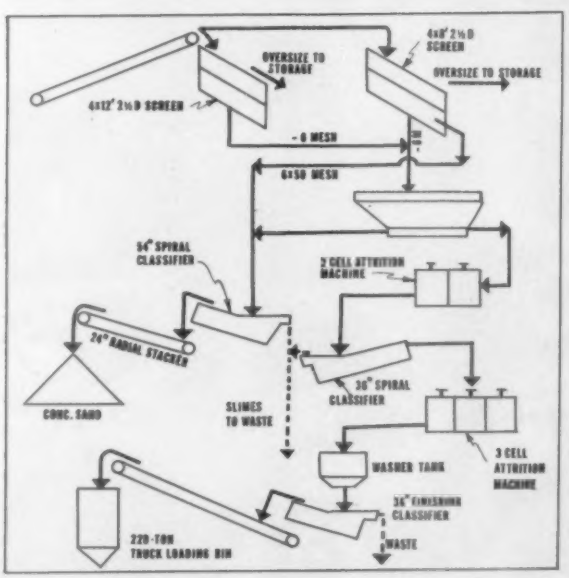
The river acts as a giant classifier and the plant is located at the point where the Bear River first meets slack water from a dam about three miles downstream. Thus, there is considerable difference in the size distribution of material throughout the deposit. The larger gravels are on the upstream side, with the sands and what little silt is present on the downstream end of the deposit. Thus a great deal of control can be exercised over the pit run material simply by changing dredging sites.

The extremely high-silica content and the clean-

Please turn page

Right: Owner Joe Chevereaux at the controls that mastermind sand blast production





A giant 54-in. diam. screw classifier takes oversize sands for concrete sand mixes. It can bleed fines from the sand machine just behind

Diversification: Extra Profits . . .

continued from page 87

liness of the raw sands make it ideal for sand blasting. The flow sheet for the blasting sand circuit was worked out over a two year period, based primarily on trial and error. But the principle problem in producing the high quality demanded for sand blasting was to eliminate any traces of soft rock present, however minute. A second, simpler problem was to eliminate a surplus in the 30 × 50-mesh range.

First processing unit in the sand circuit is a 20-ft. long sand-sorting tank. The rough classification possible with this unit makes it possible to waste surplus sand in the 30 × 50-mesh range without losing any desirable size fractions. There has been some difficulty in getting proper classification in the sand-sort. Sand tends to "dump" near the feed end of the tank. This is due to the absence of the usual amount of slimes and other suspensoid material in the classifier which ordinarily tends to buoy-up the settling particles. However, the installation of wooden baffles and careful feed regulation has eliminated this problem.

Sand settling in this machine is split into three fractions: (1) a surplus 30 × 50-mesh material to be wasted, (2) a fine fraction to be added back to concrete sand and (3) a 6 × 50-mesh segment to be processed into blasting sand. The concrete sand fines discharge into a 54-in. spiral classifier and here rejoin the coarse components of the concrete sand that went into the classifier directly from a washing screen.

Blasting sand goes directly to a bank of two attrition cells. Here, rubber-covered steel paddles rotate at high speed to thoroughly agitate the slurry. This causes the silica particles to rub against each other polishing off any trace of clay but, more important, also grinds any soft material to a small enough size so that it will be eliminated with classifier overflow.

Maintaining the density of the sand slurry at exactly 80 percent solids is the key to efficient operation of the attrition cells. Simple automatic controls regulating the water supply to the attrition cells assure this exact density. For example, as the slurry thickens, additional strain on the attrition motors makes them draw more current. Then the water valve opens diluting the slurry. When the slurry thins, reducing the motors' de-

A 2-cu. yd. dragline digs the high-silica sands from the bed of the Bear River near Auburn, California

mand on the current supply, the valve closes. This is all done automatically and requires no attention from the operator.

After treatment in the first bank of attrition cells, the sand slurry flows to a 36-in. spiral classifier. The main function of this classifier is to eliminate as much of the minus 100-mesh material as possible. An additional 550-gpm. of water is added to the classifier pool to help eliminate as many fines as possible. Fines overflowing the classifier weir can be reblended with the concrete sand in the 54-in. classifier if desired.

The classifier product is fed to a second bank of three attrition cells for further scrubbing. The attrition product is re-slurried and pumped by a heavy-duty sand pump to a de-watering tank from which it flows to another 36-in. spiral for final de-watering. The de-watered product is then conveyed to a 220-ton truck bunker ready for drying and bagging.

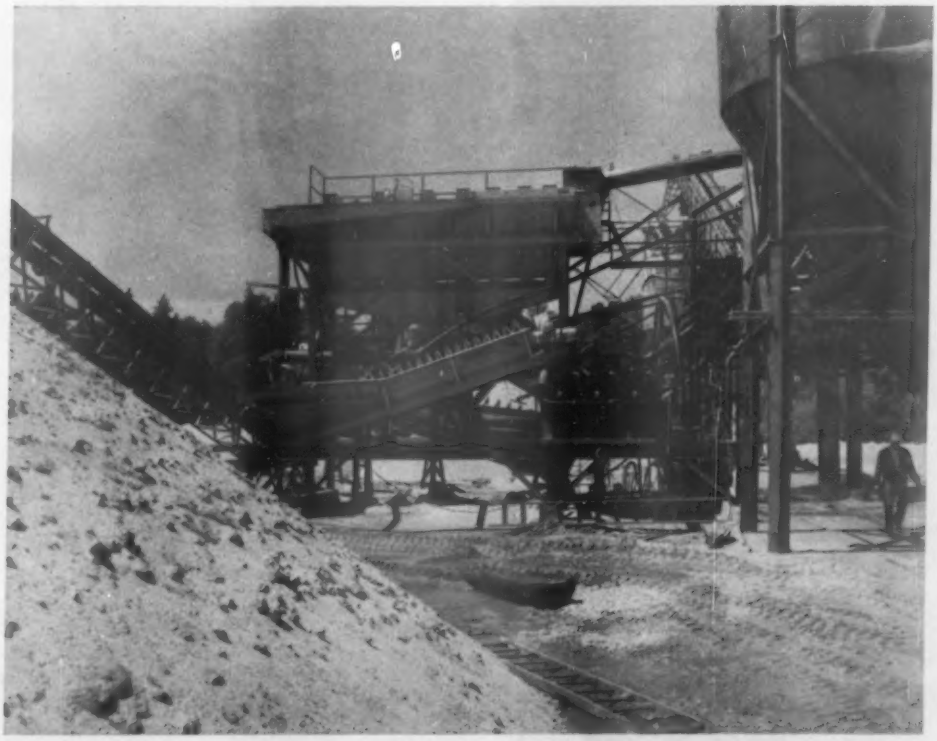
Producing a high-quality silica sand suitable as a blasting sand is only half the battle—marketing it can often be a far greater problem. Blasting sand is customarily sold as a dry bagged product in five carefully graded sizes. This could have posed many problems. Not just the processing problems of drying and sizing the sand, but the far more complex one of marketing it.

An arrangement with Dry-Mix Products, Inc., of nearby Roseville solves these problems. As a large producer of dry bagged mortar and premixed concrete, the firm already has a marketing organization. A blasting sand was a logical and potentially profitable addition to its already extensive product line. Last year Dry-Mix constructed a plant to dry, size and bag blasting sand. The arrangement has proved advantageous for both Joe Chevereaux and Dry-Mix Products Co. Now, Bear River sand—marketed under the trade name "Seirra Diamond Blasting Sand"— is being used throughout the entire Pacific Coast Region.

END

MAJOR EQUIPMENT REFERENCE

Vibrating screen, 4 x 8-ft., 2½ deck	Screen Equipment Co.
Vibrating screen, 4 x 12-ft., 2½ deck	Allis-Chalmers Mfg. Co.
Sand-sorting tank, 20-ft.	WEMCO Div. Western Machinery Co.
Spiral classifiers, 54-in.	WEMCO Div. Western Machinery Co.
36-in. (2)	WEMCO Div. Western Machinery Co.
Attrition cells, 10-in. (5)	WEMCO Div. Western Machinery Co.
Radial stacking conveyors, (2)	WEMCO Div. Western Machinery Co.
Sand pump, 4-in.	WEMCO Div. Western Machinery Co.
Front end loaders, (2)	Frank G. Hough Co.



Three attrition cells polish the sand grains to remove the last traces of fines or slimes. A pair of attrition cells is just behind the 36-in. spiral classifier

Fig. 12 (left)—Clay masses in gravel are effectively broken up by the opposing action of the paddles in double log crushers

Fig. 14 (above)—The trunnion-mounted revolving screen functions as a scalping screen and, at the same time, breaks up clays, shales and other soft deleterious materials

Fig. 13 (above)—Chevereaux Sand & Gravel Co. upgrades its sand by processing it in this battery of three attrition machines

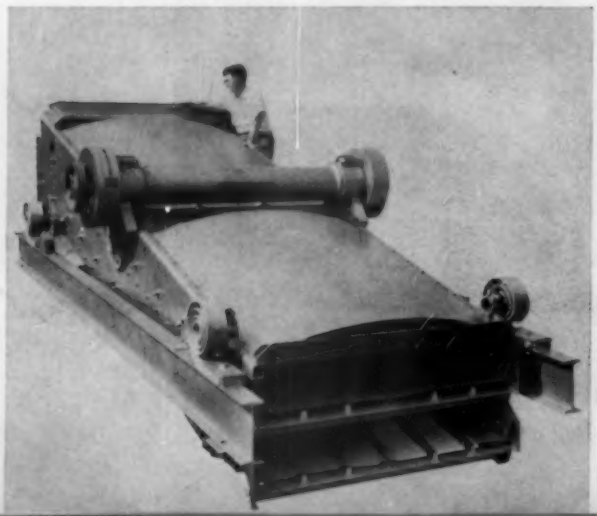


Fig. 15 (left)—Multiple-deck, high-speed vibrating screens are now universally used in the rock products industry

Here's how aggregates producers can improve their scrubbing and washing efficiency

*Aggregates processing tips, Part 2**

Scrub, Wash & Size

by C. E. Golson & D. E. Newton†

SCRUBBING AND WASHING are the second major operations before sizing the finished product. The purpose of scrubbing and washing is to remove materials—generally clays—which are detrimental to the concrete. In general these deleterious fractions will exist as:

(a) large pieces in the raw aggregates;

(b) an agglomerant of sound fractions of aggregate (much as the brittle in peanut brittle);

(c) a coating of individual particles of sound aggregates.

The action required to separate these fractions and remove them without loss differs. But it is based on the fact that they will soften when impregnated wtih water. A varying amount of externally applied forces are required to initiate or to complete the action.

- Where clay has sun-baked to hold fine aggregates in a hard, solid conglomerate, the rod mill will break it up. Washing will then do the actual separation.
- Clays hardened by exposure can be broken and fresh surfaces exposed to the action of water by the use of various types of reduction crushers.
- Gobs and masses of unaltered clay can be broken up by the action of log-washer paddles (Fig. 12), and as more surfaces are exposed faster softening of these masses is possible.

In other cases, the only forces required are those to give enough movement for the material to scour itself by attrition. This is true scrubbing action, and probably one of the most common in the aggregate industry. We can summarize the equipment in this way:

Revolving tumbling scrubbers with or without screen sections are very common. These are probably the oldest design of equipment common to both the metallurgical and aggregate industries and there has veen very little change in fundamental design.

The action of the mass of material in the log-washer is also one of scouring, and the amount of water present must be kept low for proper action. The coarse material washer uses the screw principal of the classifier to impart motion to the mass of material. It is similar in effect to the log-washer, but less force is exerted on the material.

Where coatings must be removed from fine aggregates, a high-intensity attrition machine (Fig. 13) is effective.

Washing after the deleterious substances have been softened and broken up completes the removal of the undesired fractions. The use of wash water on screens is common in the industry. Many dry processing plants are being compelled by modern specifications to resort to washing.

In the case of shales, stockpiling the sized product to expose it to weathering, causes a degradation of the deleterious fractions. These may then be removed by screening or washing.

Fine aggregate washing is carried out in wet classification devices, separating the wanted from the unwanted fractions using the principle of selective settling. Classifying tanks, screw-classifiers, drag-belt classifiers and similar installations are effective for this purpose. Sometimes the na-

Please turn page

†Mr. Golson is Consulting Engineer and Mr. Newton is Manager, Aggregate-Conveyor Dept., WEMCO Div., Western Machinery Co.

*This is the second part of a summary of a paper presented before the Industrial Minerals Div., Society of Mining Engineers of AIME at St. Louis. See, also, Part 1, August 1961 ROCK PRODUCTS, p. 87

Fig. 16—The heavy plate deck of this vibrating screen scalps off heavy material that might damage the screen cloth on the lower deck

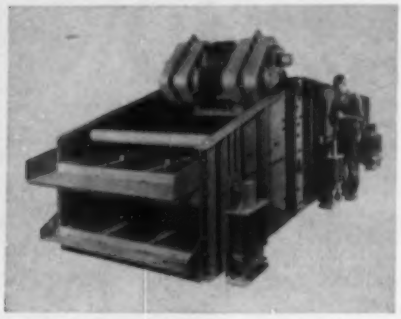


Fig. 17—Horizontal vibrating screens have taken over some of the screening chores of the inclined vibrating screen

Fig. 18—The spiral classifier is widely used in sand preparation systems

Fig. 19—Sand gradation is also achieved by grouping cones together

Aggregates processing tips . . .

continued from page 91

ture of the clay demands extremely large volumes of water and large equipment. Wet cyclones using centrifugal forces can often accomplish this action more economically.

Sizing is the final step in the preparation of aggregates. Modern specifications require accurate sizing of the various ranges of aggregates which are then proportioned into the mix to provide a concrete of designated strengths. Sizing of aggregates has become very important. The concept of sizing is more precise in this territory than in metallurgy. A sized fraction is that passing one sieve and retained on the next immediate sieve in the standard U. S. Series.

In general, all sizing of materials whose dimensions are greater than ⅛ in. is by screening. This process can sometimes be economically effective down to the No. 10 or No. 16 sieve, and occasionally, in the finer ranges. Sizing of large volumes of material below ⅛ in. is usually done by wet classification methods.

There are three general types of screening devices used:

(a) The scalping screen that removes large pieces which would require specially designed equipment for processing.

(b) The sizing screen which separates aggregates into closely sized fractions required by the specifications.

(c) The washing screen is a sizing screen with washing sprays to remove fine aggregates which are usually sent to the wet classifications plant.

According to the opening of the screening medium, three general classifications are considered: (1) coarse screening—opening larger than 4 in., (2) medium screening—openings from 4 to ½ in., (3) fine screening—openings smaller than ½ in.

The most common scalping device is the grizzly, consisting of longitudinally spaced bars as a sizing surface. These can be of the stationary type, or cantilevered so that the free end has motion induced by the shifting weight of the flowing material. Other forms of mechanically driven grizzlies combine sizing duties with those of a regulating feeder. In the traveling element type, some of the bars are replaced by rotating discs as spacers. The latest improvement is one where eccentric rollers open and close the sizing spaces. This is the wobbler type grizzly-feeder.

Revolving screens such as the trommel, and stone screen (Fig. 14), are also used as scalpers, although in most cases they include a washing action. Some shaking screens with a simple reciprocating motion are still used, although they

have been largely replaced by the horizontal type screen.

Finally, to increase the through-put, vibrating screens of exceptionally sturdy design are being used effectively as grizzlies. It is quite common to use a scalping deck on a multiple-deck screen to protect the decks underneath from the impact of overly large material on relatively fragile, fine-screening surfaces as in Fig. 16.

The use of vibrating screens with multiple decks (Fig. 15) to obtain more than one product has become universal. One of the most recent innovations is the use of split decks and intermediate decks to increase the number of products which a screen will produce.

In selecting the make and type of screen to be used for a specific sizing or washing application, they are usually designated by type: (1) unbalanced two-bearing, balanced two-bearing, balanced four-bearing, (2) horizontal screen—elliptical motion, spring supported.

In the two-bearing screens, the screen box is suspended on springs or air cushions. The rotating shaft is mounted on the screen box by means of two bearings, and the motion is imparted to the screen box by eccentrically weighted fly-wheels (balanced) or by the eccentricity of the shaft itself in relation to the bearings (unbalanced). In the four-bearing type the shaft is supported above the frame by two bearings and the box from the shaft by two more. As a general practice the unbalanced type is used on materials minus 1½ in. for separations at ½ in. or less.

Two-bearing screens may have the amplitude of the stroke dampened by the weight of material on the screen cloth. The four-bearing screen requires special support or suspension since the motion may be transmitted to the main frame. There is, however, no dampening effect of the throw by the weight of the material being screened. A recent innovation is an unbalanced two-bearing gyratory screen working at very high velocities which allows effective screening at much finer sizes than previously possible.

Newer horizontal screens (Fig. 17), have replaced the older shaking screens and the horizontal throw vibrating screens. Here, eccentric weights mounted on two separate shafts attached to the screen box furnish the motion. These weights produce this effect by revolving separately so that they are in opposition and then in addition during each 90 deg. of revolution. This effect is directed at an angle to the screen surface. The resultant movement is elliptical, with a forward component to advance the material horizontally the length of the screen.

The location of the axis of the revolving shaft in relation to the screen, the direction of rotation, the linkages which restrain the motion of the screen box and the actual suspension of the box are factors which govern the path of particles as they flow across the screen cloth. The size of the opening and their shape, the actual percentage of open area, the slope of the screen and the amount of wash water from the spray bars are factors which govern the efficiency of the screen in sizing and washing aggregates. These factors have been interpreted by each manufacturer in terms of the types and sizes offered by him. But we have been unable to find any effective correlation of these data.

An extensive discussion of wet classification for sizing and dewatering was presented to the Industrial Mineral Div. of AIME at its meeting in San Francisco, February 1959. This paper included a detailed description of the equipment used in the aggregates industry.

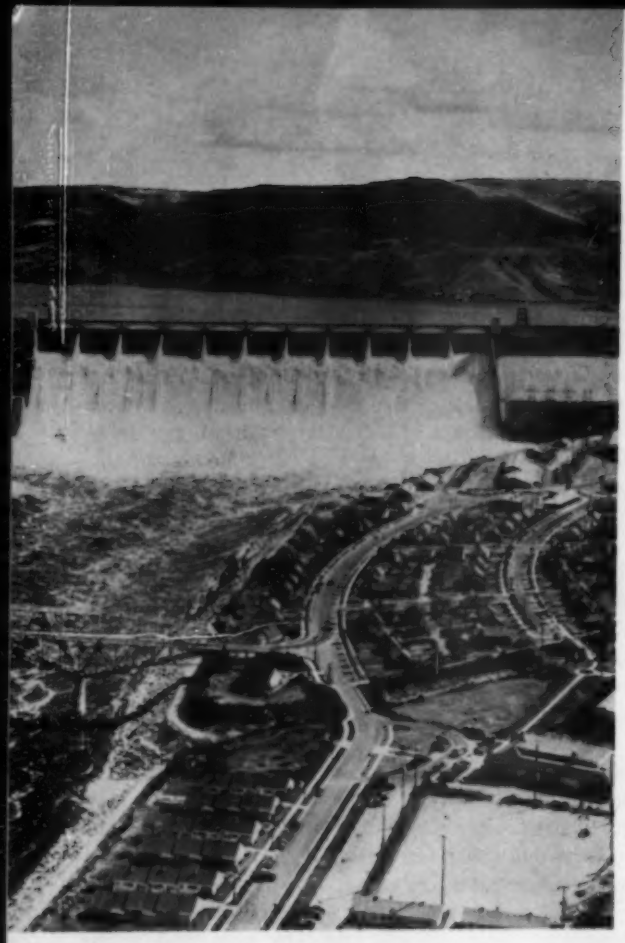
The classification of fine aggregates is far more important than we can indicate here and is, in fact, an art by itself.

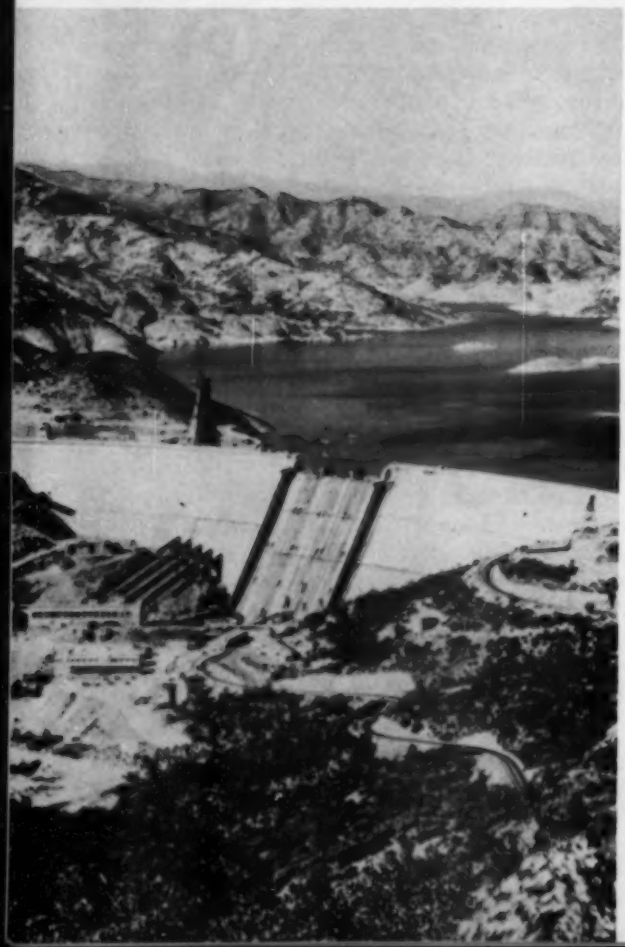
The rock products industry almost universally uses velocity classification. This is because of special requirements of the products and because the specific gravity of materials processed for aggregates is nearly uniform. Some hindered settling classification devices used in the metallurgical industry are used in the aggregate field with minor modifications for velocity classification. These include: the hydro-separator, classifying cone, drag classifier, spiral classifier, rake classifier, hydrocyclone and the hydraulic classifier.

Two types of machines which were formerly used in the metallurgical industry, but which have been superceded, are still in use in aggregate production; these are the sand washer and the sand wheel.

Aggregate technology, however, required special equipment to cope with certain problems of multiple gradations. As a result, two devices which are developments of older mining machines have extensive use in this industry, and are now finding special applications in the metallurgical industry. These are the classifying tank (Fig. 18) and the multiple cone system (Fig. 19).

Editor's note: Part III to appear in another issue of ROCK PRODUCTS *will cover equipment and techniques used for beneficiating or upgrading aggregates.*





Aggregates production at dams—

Part 3:[*]

Aggregate, power records sent tumbling at Grand Coulee Dam

by Walter B. Lenhart

THE WORLD'S LARGEST CONCRETE DAM was started in 1933 before Boulder Dam was well along in construction. Grand Coulee is not only the largest dam but the largest mass of concrete in the world, levelling off at 10,585,062 cu. yd. of 4-bag mix concrete. Completed in 1942, it is 550-ft. high and 400-ft. thick at the base. Installed power capacity from 21 generators is 1,981,500 Kva, another world's record. Concrete in the dam was cooled by river water circulating river water through 2,300 miles of pipe.

The Columbia river with its vast power potential is a favorite building site for projects of the Bureau of Reclamation, the U. S. Army Corps of Engineers and several Public Utility Districts (usually referred to as PUD's). As of today there are a number of dams built or under construction.

[*]See, also, Part 1: *New techniques born on early jobs,* and Part 2: *"Modern" processes pass test at Hoover Dam,* July & August 1961 ROCK PRODUCTS, pp. 88 & 102, respectively

Above: Grand Coulee is not only the largest dam but also the largest mass of concrete in the world

Below: Shasta Dam, the second largest concrete structure in the world, was the keystone for the great Central Valley Project

Starting with the one farthest upstream and working down they are: Grand Coulee, Chief Joseph, Rocky Reach, Rock Island, Wanapum, Priest's Rapids, McNary, John Day, The Dalles and Bonneville. Ice Harbor and Hungry Horse dams are on tributaries.

This mighty array of power stems from the enormous flow of the Columbia River. At Grand Coulee, for instance, the river has been known to have a flow of 725,000 cu. ft. per sec. The annual run-off is about 77-million acre ft. as measured at Grand Coulee. This amount of water would fill Boulder Dam's lake in about five months.

Initially, power from the dam was used to pump water. There are 12 pumps in service, each with a 65,000-hp. motor, and one generator serves two pumps. These lift the water 310-ft. through 12-ft. diam. steel pipes to a giant storage lake. Water then flows by gravity in open concrete-lined canals and through the world's largest concrete pipe to a vast distribution system that irrigates over a million acres of farm land. Power is sold through a power pool to public utilities, cities and to large electro-metallurgical plants in the northwest.

The world's largest sand and gravel plant was built to supply aggregates for Grand Coulee Dam. Even today it has not been surpassed in size. Because the deposit is high in sand, 2,500 tph. of raw materials had to be processed to get 1,000 tph. of finished material. Top size of the gravel aggregate was 6 inches.

Screening of aggregates was all wet. The minus ¼-in. sand went to 8 chain drags equipped with 10-ft. wide flights and were mounted side-by-side. The overflow went to a large clarification set-up and the de-watered sand split; part to waste, and the rest to the sand classifying section. It was estimated that 277 tph. of sand and 723 tph. of gravel were produced in this way.

As an indication of the size and importance of this plant when the late Edmund Shaw, associate editor of ROCK PRODUCTS visited the site, his description of the operation took up 14 pages of the March 1936 issue. This is probably another record.

There were at least two important "firsts" at this job. One was a hopper over a pendulum conveyor in the pit that was mounted on crawler treads. The other, the use of two foundry sand mixers to mix the three sizes of sand produced ahead of stockpiling.

The field hopper had a sliding grizzly bar screen on its top. When 14-in. rock accumulated on the grating, hydraulic cylinders slid the assembly forward. It would then tip and discharge its load of gravel to the ground. The hopper had a 48-in. vibrating feeder under it to put gravel in a belt conveyor.

More than 4½ miles of conveyors (not belt lengths but actual conveyor lengths) used belts from 24 to 60-in. wide. More than 20,000 gpm. of wash water was in circulation in the plant. Water for the sand plant alone was supplied by two 8-stage centrifugal pumps rated at 2,500 gpm. each.

Mr. Shaw used a long paragraph describing the "lowering ladders" used—stone ladders of a more recent description. So while not a first, it was surely a "near-first." At times there were 4 cu. yd. shovels and two 5 cu. yd. shovels. These filled the hopper over the pendulum. Pit-run went to a surge pile under which were two 42-in. feeders rated at 1,250 tph. each. They supplied a 60-in. wide belt conveyor, a monster in those days.

The aggregate was highly silicious with granite rocks and some basalt present. It is interesting to note that on page 50 of the "Concrete Manual—Sixth Edition," published by the Bureau of Reclamation, that the following appears: "the unusually high strength of Grand Coulee concrete is probably due to the pozzolonic effects of the glacial flour in the aggregate."

The minus 14-in. material (but not much 14-in.) was split between two 6 x 22-ft. rotary screens with square openings to give a minus 6-in. product. The oversize went to a 20-in. crusher in open circuit; its product joined with the throughs from the rotary screens and went direct to a surge pile.

The washing and screening plant was divided into two identical sections with two 42-in. feeders under the surge pile. There were six 5 x 10-ft. screens in each section and they prepared the 3 x 1½-in., 1½ x ¾-in., ¾ x ¼-in. and the minus ¼-in. sand which went to the 8 drags.

Finished sand was prepared in three bowl classifiers in series. The first prepared a 4 x 20-mesh product with fineness modulus of 3.44; the second, a 20 x 48-mesh product, fm. 1.83; and the third, the 48 x 100-mesh sand, fm. .75. The three sizes then went to separate piles for storage and drainage. Belt feeders with cutter gates were under each pile so additional feed control could be exercised—two feeders under each of the two coarser sands, and one under the fine sand pile. The blended sand went to the mixers and then to the concrete batching plant. The finished sand had the screen analysis shown in Table I.

Please turn page

Aggregates production at dams . . .

continued from page 95

The sand plant was not only the world's largest but, as Mr. Shaw stated, ". . . probably the highest development to date in the realm of high-specification sand production."

Grand Coulee dam today is the mecca of probably a million tourists per year . . . easily reached from Spokane, Wash. When the dam's Center spillway is overflowing up to 1 million cfs., it is one of America's inspiring sights. I've been there a dozen times myself.

The Shasta Dam, the second largest concrete structure in the world, got under way in 1938. The dam is a few miles north of Redding, Calif., and on the Sacramento River. Completed in 1945, it was the keystone dam for the great Central Valley Project that envisioned a dozen or more large dams and hundreds of miles of large concrete canals, all a part of the development of the Sacramento-San Joaquin rivers and tributaries. Since Shasta Dam was built, Friant, Pine Flat and Folsom—all large structures—were constructed. Other parts of the project include the Friant-Kern Canal, the Mendota Canal (almost large enough to float a destroyer), and the Tracy pumping plant, the second largest pumping plant in the world. You can see that the 1930's were busy years for the Bureau of Reclamation.

The Sacramento River rises in southern Oregon and northern California where the annual rainfall is as much as 115 in. The San Joaquin, American, Yuba, Kern, Kings and other large streams start high in the Sierra Nevada mountains where the annual snowfall is as much as 600 in.; thus the spring run-off is extreme. The Central Valley Project would store this water for irrigation, flood control and power, but in southern California the annual rainfall is often no more than 8 to 10 in., and this is the most populated area of the state. About 18 percent of the nation's irrigated land is in the Central Valley Project and is certainly its most productive in agricultural wealth.

The first three large dams built by the Bureau of Reclamation—Boulder, Grand Coulee and Shasta—had several things in common. All accented strength and stability. All used a 4-bag, or more, mix in the massive concrete. All used 6 to 9-in. top size aggregate. All maintained a 2 to 3-in. slump at the mixer. All had a water-cement ratio between .55 to .59. The base-height ratio (base thickness divided by height) of all three dams was identical, .90. All used the highest quality aggregates equal to the nation's best. All had foundation structures of granite or other equally stable rocks and all were built by men who wanted and produced the best.

Table I—Screen analysis of finished sand

	Percent retained
4 mesh	0.00
8 mesh	12.0
14 mesh	20.0
28 mesh	24.0
48 mesh	24.0
100 mesh	15.0
Minus 100 mesh	5.0
fm.	2.75

The modern trend in high dam construction in this country is to use a 2-bag mix and have base-height ratios as low as .30 to .43. Foreign dam builders go to .10 and even less. Shasta Dam had an important impact on the portland cement industry in the west. Kaiser interests, prime contractors at Shasta, built their own cement plant at Permanente, Calif. At the time it was the world's largest, and even today is still one of our largest producers. Calaveras Cement Co. and the now-defunct Stockton Portland Cement Co. benefited greatly from the great construction boom during that era.

Shasta Dam is a curved gravity structure 602-ft. high with 543-ft. base thickness and a massive 6,541,000 cu. yd. of concrete. It has two important "firsts" to its credit as far as aggregate production is concerned: (1) a large-capacity rod mill to manufacture sand and (2) belt conveyors to deliver 1,100 tph. of finished aggregates more than 10 miles over mountainous country. This extensive use of belt conveyors for a similar purpose has not been equalled since.

The aggregates for Shasta Dam totalled 7.6 million cu. yd. of gravel, and 2.8 million cu. yd. of sand, all produced by an affiliate company of the dam's prime contractor which was headed by the Kaiser interests.

The plant resembled the one at Grand Coulee in many ways, producing 1,000 tph. Pit conditions were very wet and required a 7 and a 10-cu. yd. walking dragline; these delivered to a pendulum conveyor serving the plant system. The deposit contained some friable material that was objectionable. This was reduced to specification requirements by the use of an 8 x 30-ft. blade mill on the gravel augmented with an 8 x 11-ft. "slug" mill cleaning up the sand. A slug mill was a differential grinding unit designed to grind the soft items and not the harder. However, to make up for the loss in fines an 8 x 12-ft. rod mill was used to reduce

Please turn to page 126

Part 2*

Welding shops can help cut your hardfacing budget

COMPARATIVELY FEW QUARRIES, aggregate plants and earth-moving firms find it economical to set up a complete automatic welding shop for rebuilding and hardfacing wearing parts. The cost of such equipment is considerable, highy skilled operators are required, and a fairly continuous operating schedule is necessary in order to recover the investment. Only those who have a large number of crushers, bulldozers, scrapers, shovels, etc., are in a position to show a profit by maintaining such parts as tractor rollers and idlers, track links, shovel pads and idlers, house rolls, crusher cones and mantles and crusher shells.

The average firm is likely to find it more satisfactory and less costly to entrust rebuilding and hardfacing to an established automatic job shop. Within the past few years scores of such shops have been set up in all parts of the United States and Canada; some are independent organizations handling all types of rebuilding work, others are

Please turn to page 124

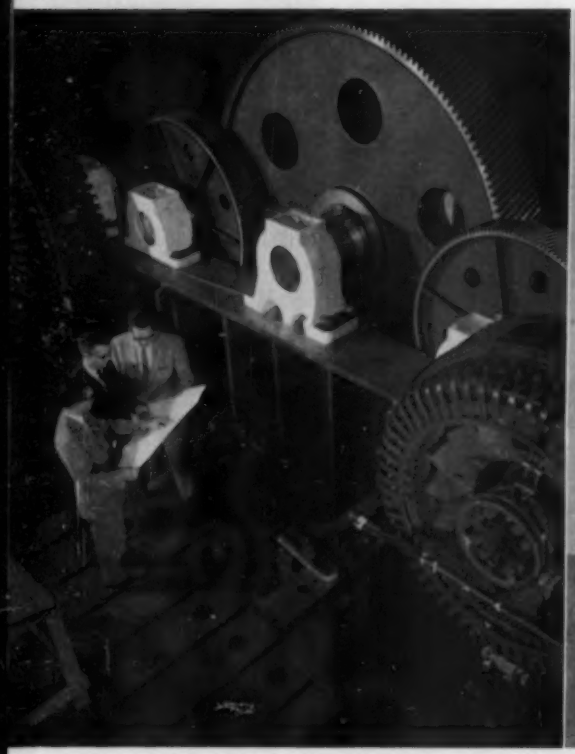
*This is the second of three articles on the basic features of hardfacing. See, also, Part 1, September 1961 ROCK PRODUCTS, p. 104

Above: An established job shop usually has the equipment to do specialized hard-surfacing jobs economically *(Victor Equipment photo)*

Center: Welding shops frequently have the skilled personnel to do the unusual job, like rebuilding truck cam shaft assemblies, then grinding them to finish tolerances *(Wall Colmonoy photo)*

Below: Routine production jobs, like rebuilding track rollers, are done on semi-automatic equipment *(Wall Colmonoy photo)*

ideas and news:



Full-load demonstration proves 98%-plus drive efficiency: A-C factory engineers recently demonstrated the high efficiency of TWINDUCER grinding mill drives. It ranged from 98.48% to 98.52%. This exclusive twin motor drive system divides mill load electrically, saves space, installation costs, minimizes gear wear.

Low-cost system automatically correlates bulk materials handling data: An A-C data-handling system now being installed in a midwestern coal tipple automatically weighs coal shipments and transmits all pertinent data to a central invoicing location. Similar systems in the cement industry, applied to raw materials as well as loading of bulk or bagged cement, provide accurate quantitative data. This system has been developed by A-C through its exclusive Systemation service.

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A-C transformer offers multiple benefits: Located close to the load center in a Midwest cement plant, this 5000-kva CHLOR-EXTOL filled transformer provides reduced power losses, better regulation, and flexibility for expansion. Types available also include oil-filled, liquid-filled, and dry-type units (both sealed and open).

High-output — low installation costs: One of the world's largest aggregate-handling screens met the needs of an aggregate producer for higher output and minimum installation costs. This 7 by 20-ft RIPL-FLO screen handles 600 tons per hour and is mounted on foundations previously used for a 5-ft screen.

So low, two fit where one used to go: This new SPACEMAKER control center is the first completely new 2- to 5-kv motor controller development in more than a decade. Two-high design can cut floor space needs in half. Full drawout construction makes it the safest, most easily accessible controller available. Flame-retardent, track-resistant PYRO-SHIELD insulation adds reliability. Walk-in SHELTER-CLAD enclosures availabe for outdoors.

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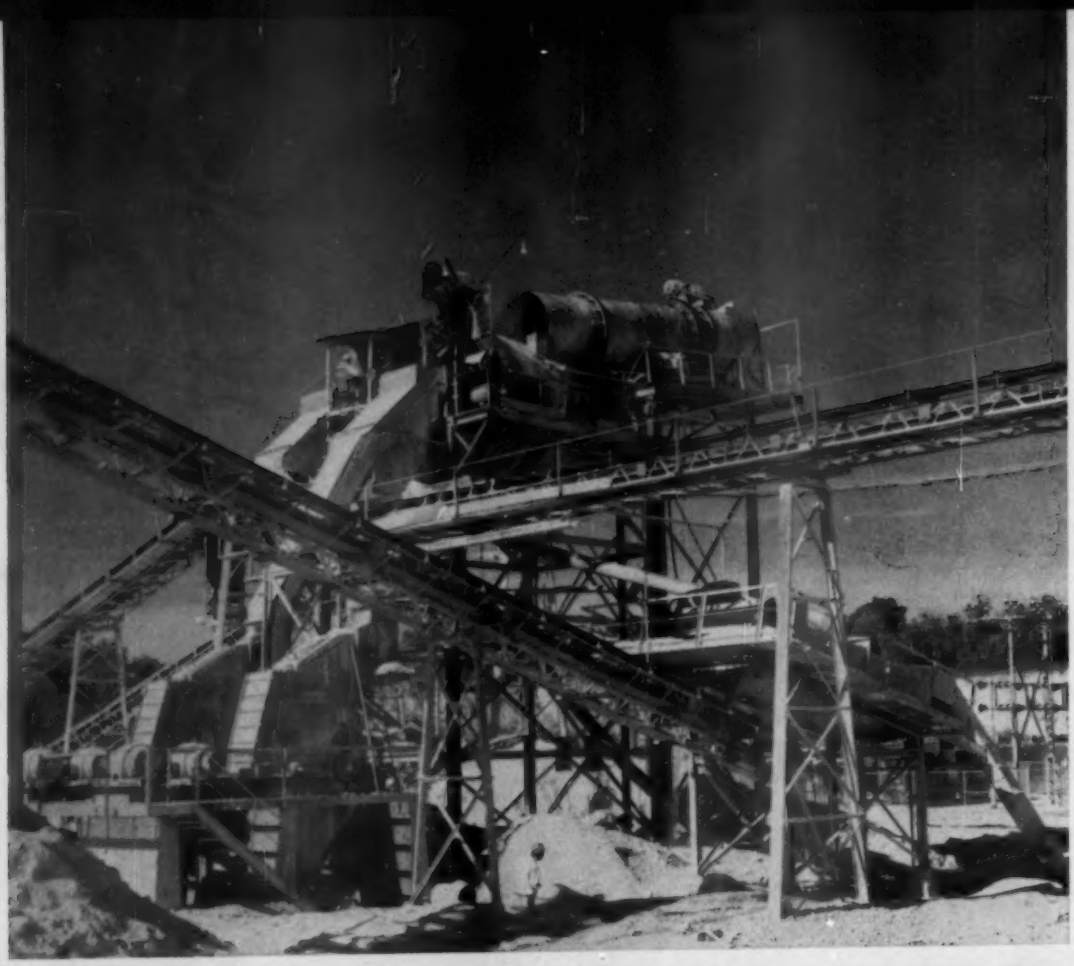

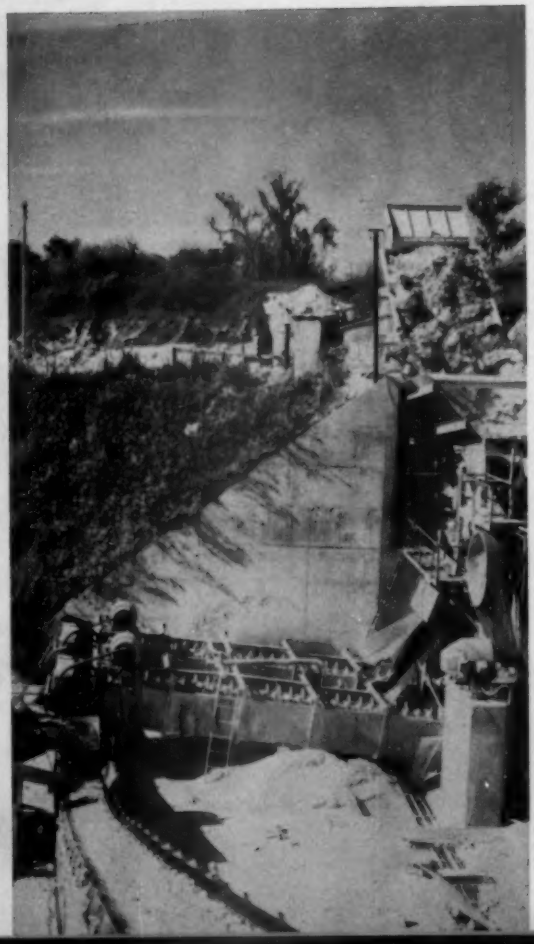

An ingenious array of equipment strips out clayey contaminants at Brooksville Rock's crushed stone plant

Scrubbers whip limerock matrix

by Elwood Meschter

AN IMPRESSIVE ARRAY of heavy-duty scrubbing and rinsing equipment processes limerock at Brooksville Rock Co.'s crushed stone plant near Brooksville, Fla. Only in this way is it possible to release the sparkling white aggregate from its matrix of clayey material and to produce a first class aggregate efficiently.

A big rotary scrubber is the heart of the processing system and it is teamed with four large double log washers. Auxiliary, but very important, equipment is the pair of horizontal vibrating screens that play a vital part in stripping off the last traces of the clinging matrix, and three similar units that separate the finished material into production sizes.

Water plays an essential part in the process that scrubs the limerock. More than 6,000 gpm. of fresh water from deep wells is used as more than 1,000 tph. of crude limerock from the Suwanee Formation is processed to yield more than 500 tph. of finished aggregates in five basic sizes.

Primary scrubber in the setup is a 6 x 24-ft. rotary drum. This unit is equipped with lifters, and washes and tumbles the stream of plus 2-in. rock as it comes from the primary jaw crusher. The four 36-in. x 30-ft. double log washers are in the fines processing system. One pair takes minus 2-in. raw feed and scrubs it before it goes into the screening and crushing circuit that incorporates the second pair of log washers of the same size.

Once the raw limerock has been scrubbed, crushed and screened to production size, it is ready to be screened to aggregate specification sizes in a conventional screening system. But even here, the sizing screens act as rinsing screens to remove as much water as possible which might contain traces of the persistent matrix. The simple, straightforward production screening setup includes another crusher to give great flexibility. As a result, the plant can produce virtually any specification of size and gradation to meet the demands of Florida's construction industry.

Brooksville Rock's basic sizes are usually 1¼ x 1 in., 1 x ¾ in., ¾ x ⅜ in. and ⅜ x $\frac{3}{16}$ in. These aggregates are stored over a single reclaim tunnel to be blended at the time of shipment. A fifth size, Florida 17A, is seldom used in a blend so this material is stored in a separate pile and reclaimed with a clamshell crane. Most of the plant's output is shipped by rail, but truck loading bins and truck scales are being installed.

The quarry is worked at two faces to maintain a blend of hard limerock with less than 50 percent matrix. One face runs as high as 70 ft., while the other seldom exceeds about 40 ft. It takes three 1½-cu. yd. shovels to keep up with the six 18-ton haulage trucks that pour raw limerock into the big 42 x 48-in. jaw crusher. As the quarry face gets further away from the crusher, it will be necessary eventually to equip each shovel with a 2-cubic

Please turn page

Above: The rotary scrubber, primary unit in Brooksville's limerock processing system, dominates the plant

Left: Crushed material is scrubbed in these two double log washers, but it can be bypassed directly back to two rinsing screens

Right: Another pair of log washers takes minus 2-in. fines direct from the grizzly and puts them into the system after scrubbing them thoroughly

Scrubbers whip limerock matrix

continued from page 101

yard bucket to reduce each truck's turn-around time.

A vibrating grizzly above the jaw crusher takes out the minus 2-in. limerock, sending only oversize to the crusher. The grizzly receives its supply of rock from an apron feeder while an operator stands by to make sure that the system is not surged. Through-grizzly fines drop to a pair of 36-in. x 30-ft. double log washers, first units in the fines processing system.

All rock through the primary jaw crusher goes to the rotary scrubber on an inclined belt conveyor. There it is sprayed with water at high pressure and tumbled thoroughly before it is discharged to a pair of horizontal rinsing screens. Sprays above these screens strip any clinging matrix from the aggregates, and the wash water from scrubber and screens is collected in a hopper below the screen.

Size and gradation of the finished products are primarily controlled with an unusual arrangement of chutes and flop gates under the rinsing screens and directly above the secondary crushers. It is possible for the operators to divert the flow of crushed rock to one or both double-impeller secondary crushers in any proportion or to divert part of the material over the top deck of the screens directly to the production screening part of the setup. It would also be possible to operate the plant at reduced capacity if one rinsing screen or one crusher were cut out of the circuit.

A great deal of additional production flexibility is available to the plant's operators by changing the screen cloths on the three-deck rinsing screens.

The 70-ft. wall of hard limerock in the Suwanee formation dwarfs the heavy equipment which works at it

These screens control the size of material sent to the secondary crushers and the top and bottom sizes sent on to the aggregates processing system.

Fines discharged from the two crushers are collected on an inclined belt conveyor leading back to a pair of 36-in. x 30-ft. double log scrubbers. However, it is possible to bypass the scrubbers and to put the stream of material directly on the belt returning the fines to the rinsing screens. This belt also takes the scrubbed limerock from the two log washers under the primary grizzly. But, since all material going up the incline is saturated with water, the conveyor belt has molded chevrons on its carrying surface to improve conveying efficiency of the soupy material.

Since washing and scrubbing are such an important part of Brooksville's system, water handling is important, too. Fresh water comes from three deep wells at a rate of 6,000 gpm. and is pumped directly to the screens, washers and scrubber. Waste water is piped back from screens or washing equipment into a deep sump about 20 ft. below grade. Here, a 12-in. centrifugal pump with a 250 and 300-hp. tandem drive pushes the waste water uphill to a tailing pond system. Here, the tailings are removed and stockpiled with a dragline. After they are dewatered the dragline loads haul trucks that take the refuse to fill areas.

First production is achieved at the point the rinse water comes off the two primary rinsing screens. These fines are flumed to a 30-in. dewatering screw that takes out the $\frac{3}{8}$-in. x 10-mesh sand as the overflow goes to the sump. A belt conveyor takes the sand to a storage pile which, like others in the plant, is distributed with a bulldozer. This system spreads the wet finished aggregates into layers to dry and, at the same time, minimizes segregation of sizes.

A horizontal belt conveyor from the primary rinse screens takes limerock to the first production screens in the system. These are a pair of 3-deck horizontal vibrating screens which normally split the flow of material. However, for greater production flexibility the flow of material may be proportioned between them and gradation may be controlled by changing the screen cloths.

Oversize from these screens normally continues on to the final screen in the system where the two largest sizes are removed and stockpiled. Oversize from this final screen is dropped to a double roll crusher, crushed and conveyed back to one of the

Please turn to page 106

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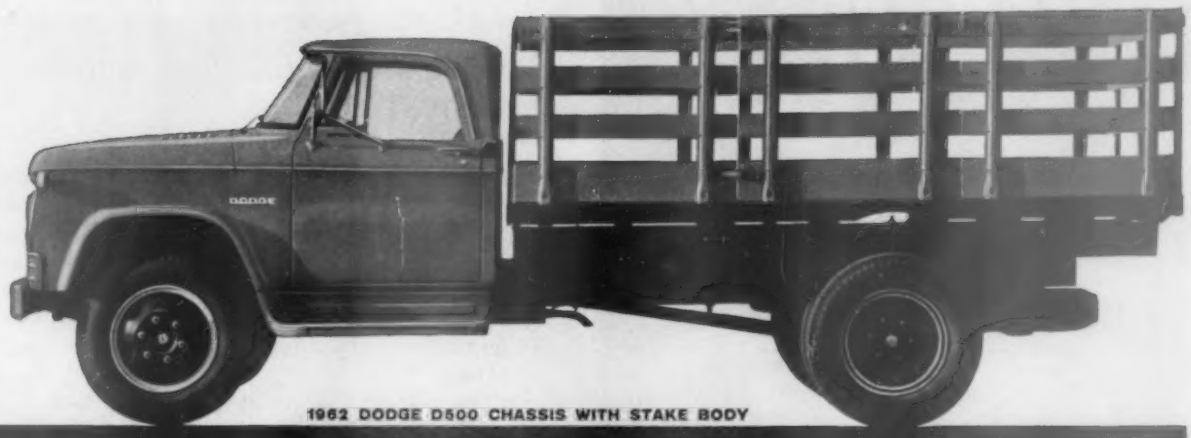

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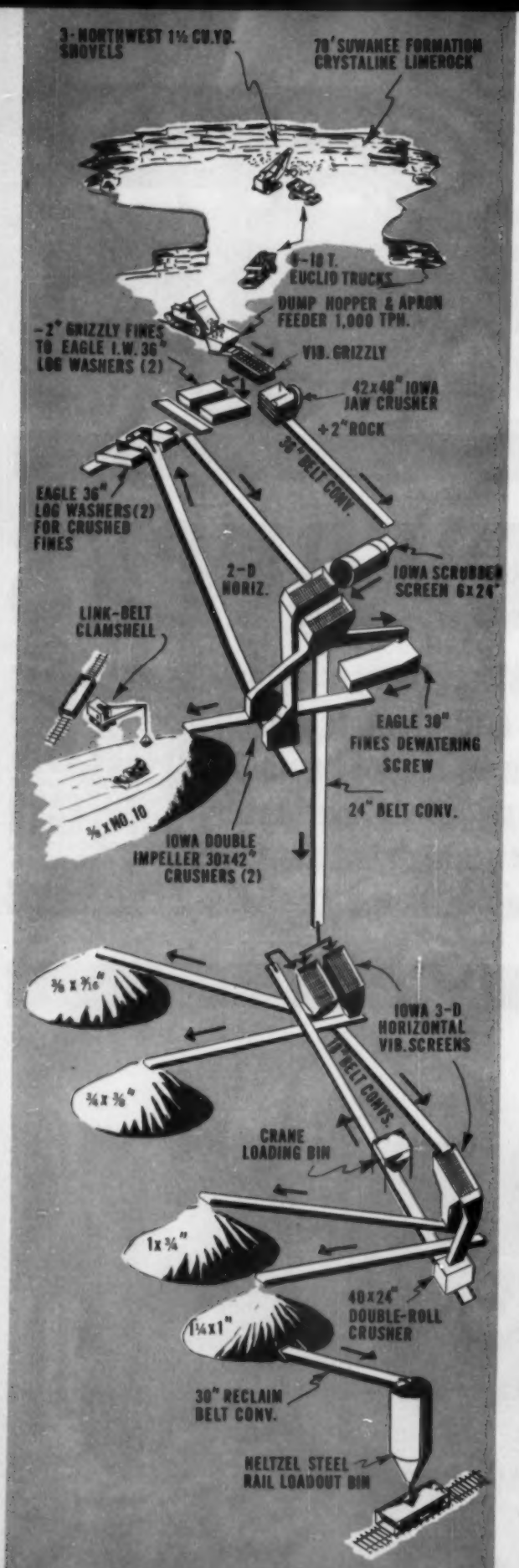
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IOWA SCRUBBER SCREEN 6x24'
LINK-BELT CLAMSHELL
EAGLE 30" FINES DEWATERING SCREW
24" BELT CONV.
⅜ x NO. 10
IOWA DOUBLE IMPELLER 30x42" CRUSHERS (2)
⅜ x 3/16"
IOWA 3-D HORIZONTAL VIB. SCREENS
18" BELT CONVS.
¾ x ⅜"
CRANE LOADING BIN
1 x ¾"
40x24" DOUBLE-ROLL CRUSHER
1¼x1"
30" RECLAIM BELT CONV.
HELTZEL STEEL RAIL LOADOUT BIN

Scrubbers whip limerock matrix

continued from page 102

first two screens in the setup. Here again, the setting on the crusher determines the size of fines in the finished aggregates. As an additional item of flexibility, it is possible for a clamshell crane to put the larger finished sizes back into the circuit to be resized and, if necessary, to be recrushed. To do this a steel bin has been placed over the recycle belt.

When material is to be shipped by rail it is drawn from the four piles over the reclaim tunnel through gates. As the piles are depleted, the bulldozer pushes aggregates back from the layered piles to the reclaim area.

The reclaim tunnel runs under four of the five stockpiles. It is possible to make a blend of aggregates going to the 30-in. conveyor by regulating the flow of material through the reclaim gates under the piles. Reclaimed limerock is loaded into rail cars through a circular steel shipping bin.

END

MAJOR EQUIPMENT REFERENCE

Quarry shovels, 1½, 2-cu. yd. (3)	Northwest Engineering Co.
Haul trucks, 18-t. (6)	Euclid Div. GMC
Deepwell pumps, 12-in. (3)	Fairbanks, Morse & Co.
Tailings pump, 12-in.	Thomas Foundries Inc.
Jaw crusher, 42 x 48-in.	Iowa Mfg. Co.
Trunnion scrubber, 6 x 24-ft.	Iowa Mfg. Co.
Double impeller impactors, 30 x 42-in. (2)	Iowa Mfg. Co.
Double roll crusher, 40 x 24-in.	Iowa Mfg. Co.
Vibrating screens, (5)	Iowa Mfg. Co.
Log washers, 36-in. x 30-ft.	Eagle Iron Works
Screw classifier	Eagle Iron Works
Bulldozer, TD-20	International Harvester Co.
Shipping bin	Heltzel Steel Form & Iron Co.
Clamshell crane, LS-98	Link-Belt Speeder Corp.
Conveyor belts	Thermoid Div. H. K. Porter Co.
Conveyor belt, chevron	B. F. Goodrich Co.
Conveyor idlers	Hewitt-Robins Inc.
Plant design	A. E. Finley & Asso.

Stockpiles of wet, newly screened rock are distributed in layers with a bulldozer to dry out in the tropic sun

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NSGA Board Meeting highlights current work on . . .

Taxation, public relations and engineering

TROUBLES IN OWNING and successfully operating sand and gravel plants for the past few years have arisen, in great part, from the general areas of taxation, public relations and engineering. And that's the best of reasons for accenting those problem areas at the meeting of the Board of Directors, National Sand & Gravel Association, held August 22-24 at White Sulphur Springs, W. Va.

Some of the troublesome developments include those that may result from the President's proposals for changing the federal tax laws. Bills that would affect the plant operators' position on depreciation and percentage depletion have been considered by Congressional committees. Consensus is that there will be no bills of major magnitude passed in this session. But the President, Treasury and Congress have all but promised that the revenue situation will be overhauled next year.

A potentially dangerous situation in the public relations area exists in the future Supreme Court review of a New York zoning case. The New York high court has upheld a Hempstead, Long Island, zoning ordinance, against a sand and gravel producer, that would upset the now accepted nonconforming use principle. Further, it virtually prohibits an operator from excavating and mining his owned reserves. If the Supreme Court concurs with the New York court's findings, it is conceivable that the industry would be hard pressed to survive, in that its future operations could be wholly dependent upon local zoning board action.

A controversial subject in the area of engineering research is the effect of maximum size on aggregates in concrete proportioning. A former report of the engineering department on this subject has caused lots of international discussion. It proposed a maximum size theory in which advantages are believed to come with use of smaller maximum sizes of coarse aggregate. Further research on this is being continued. According to NSGA engineering personnel, work in this area will be more far-reaching than any other subject of concrete proportioning to date.

Taxation problems that concern the future welfare of the industry are put before the working Board by Robert Mitchell, committee chairman

Busy sessions were conducted under the direction of NSGA President, E. K. Davison (center). Others at the table include (left to right): Mrs. Nan Cavey, secretary to the managing director; K. E. Tobin, Jr., associate managing director; V. P. Ahearn, managing director; J. Sapienza, counsel; R. Mitchell, chairman, Committee on Taxation, and S. Walker, director of engineering

The Board heard discussion about and took action on these and other matters that, based on long experience with such problems, were in the best interests of the industry and its producing members. In addition, it handled current association matters and was informed on plans for the February 1962 Convention & Exposition, which will be the largest of its type ever held by the Association for the industry.

Discussion of tax matters included brief descriptions of the so-called Ikard bills HR 7057 and HR 7058. Purpose of the former bill is to freeze 1959 and former taxable years for the brick and tile industries and to let the Cannelton case principles take over on later years. The latter bill, also on the brick and tile industry, increases the rate of percentage depletion from 5 to 15 percent and contains allowable processes up to entry into the kiln. In both cases, sponsor of the bills has indicated to the sand and gravel industry that he would consider adding to them suitable language that would apply the principles to that industry. No action is expected on HR 7058 this year, but there is a possibility that HR 7057 may get attention by this session.

Depreciation legislation has been considered by the Ways & Means Committee. It approved a proposal that would grant a credit against tax of 8 percent of investment expenditures in any taxable year, with limitations. The credit, in the tentative proposal, is to be applied only to "tangible personal property" that has a useful life of 6 years or more. Another limitation is 50 percent in reduction of tax liability in any one year, excepting the first $100,000 of tax liability.

The committee proposal was not specific as to what constituted tangible personal property, but it is important to the industry that such be clarified. It is believed to cover all movable machinery and equipment, but the important point is whether it is depreciated for 6 years or more. But, there is some doubt that this bill will pass Congress this session.

General tenor of Congress on tax problem is indicated by these tax offsets that were approved by the Ways & Means Committee: (1) withholding tax on interest on dividends, (2) reduction of leeway on expense accounts, (3) taxation of foreign income and (4) setting up of account numbers for each taxpayer and processing through automatic data processing equipment.

Developments on zoning in the sand and gravel industry have resulted in both good and bad effects on plant operators. These developments have been followed closely by the Association's committee on public relations. Outcome of the Hempstead vs. Goldblatt case, up for review by the Supreme Court in its October session, will be of greatest importance to the industry. Mr. Goldblatt, who operates a sand and gravel operation in Hempstead, Long Island, N. Y., that has been working since 1927, is seeking relief through the Supreme Court from a local zoning ordinance that would, in effect, put him out of business. Goldblatt contends that enforcement of the ordinance deprives him of property without due process of law and is thus unconstitutional, and also that the ordinance provides criminal punishment for doing acts that were legal when done.

Officers and executive committee members pose for a brief shot between active sessions of the Board Meeting. From left to right: Harold E. Bender, secretary-treasurer; C. G. Cooley, executive committee; E. K. Davison, NSGA president; Fred P. Curtis, vice president, and Charles M. Everhart, executive committee

The property was first zoned as residential in 1930. A town ordinance in 1945 required him to completely enclose his property with 7,000 ft. of chain-link fence, to protect the public from the artificial lake developed by excavation for minerals. The town tried to stop his operations again in 1956. In 1958 it amended its ordinance to disallow excavation below water line, to require sealing in of excavations previously made, to change the permitted grade of slope from 45 to 30 degrees and to require a concrete curbing under the 7,000-ft. fence. The ordinance also provided for criminal penalties each week for his failure to conform.

The New York Court of Appeals, highest in the state, upheld a lower court's decision in favor of the town of Hempstead on the amended zoning

Please turn page

NSGA Board Meeting . . .

continued from page 109

ordinance. It's now in the hands of the U. S. Supreme Court. An issue involved is whether a sand and gravel operation is a nuisance as a matter of judicial notice, as the town of Hempstead contends. Concurrence by the Supreme Court with the Hempstead contention would have drastic effects on the industry.

On the other hand, the Public Relations Committee reported on a proposed zoning ordinance in Fairfax County, Va., that is reasonable both to the industry and the community. Such ordinance proposes to set aside two areas in the county that contain sand and gravel deposits as sand and gravel zones. A time limit would be placed on the two areas, after which they would be rezoned for other purposes. Performance standards would be imposed on operations within the zone, and compliance would be a condition for obtaining a permit or permit renewal.

The ordinance has not yet been enacted, but is in the hearing stage. If enacted, it surely will represent a notable instance of cooperation between the sand and gravel industry and professional planners.

The Association, through its Public Relations Committee, has developed a much closer relationship with The American Society of Planning Officials with resulting benefits to the industry. Of major importance is a cooperative effort of the two groups to revise the ASPO model zoning ordinance for sand and gravel operations. Actual work on the revision and re-publication will be done by Professor Israel Stollman of Ohio State University. However, the Association PR committee will have full right to review and criticize to the extent that difference of opinion, although none is expected now, will be recorded in the new publication. It also will record the fact that the Association cooperated in the revision.

Association staff members served at a round-table session at ASPO's annual meeting last May to discuss extraction of earth projects. It turned out that most of the discussion was on the sand and gravel industry. This is additional evidence of the more cooperative spirit between the two organizations. Reception by the planners to the remarks of NSGA personnel, to the land rehabilitation display cards, distribution of the zoning booklet and NSGA's new rehabilitation publication was excellent.

The latter publication, titled "Case Histories: Rehabilitation of Worked-Out Sand & Gravel Deposits," is the latest publication of the PR committee. It has been given wide distribution, with the assistance of ASPO, to virtually every planning agency in the U. S. and Canada, and to colleges and universities that have a planning school. Response to the publication has been excellent, and all comments have been favorable.

The committee either is developing now or is considering the publication of nearly 10 additional booklets covering various areas of zoning, land rehabilitation and others of importance to the public relations program of NSGA.

The Engineering Department of NSGA is currently involved in carrying out several important research projects, planning new ones, publishing research test data for general distribution and otherwise assisting members with engineering problems. It operates the laboratory at the University of Maryland, supports Fellows doing graduate work and conducts an annual short course on concrete aggregates and concrete.

One of the most important research projects conducted by the Engineering Department in many years is that dealing with the effect of maximum size of aggregates. An original report on the subject was prepared for delivery before the American Concrete Institute, and its presentation caused much international discussion. Work on the project is continuing, with concrete batches using 56 sources of aggregates now being mixed. It is expected that a general compilation of data from these tests will be available for the February 1962 annual meeting. An opinion at this point in the project is that the resulting data will support the maximum size theory—that advantages come from the use of smaller maximum size of coarse aggregate.

Among research projects underway is one on the use of chert gravels. Although chert has some disadvantages when used in concrete, it is believed that it can be used successfully in highway and other construction work. Question of economics in use is the big factor. Another project deals with the effect of fine aggregates. It is proposed to find out what properties of fine aggregates control the strength properties of concrete. Other studies include those dealing with volume changes in concrete and aggregates for masonry mortar. Future studies on colored concrete, concrete strength and bituminous mixtures are being planned.

Acquisition of public lands for sand and gravel production is a problem of major concern for western operators. Public Law 167 specifies that concrete aggregates are "common varieties" of

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The 1961 Controllers Conference—biggest and best held to date —proved the value of forum sessions in exchanging information on fiscal matters

Controllers exchange know-how on financial practices

ACCOUNTANTS AND CONTROLLERS in the sand and gravel and ready-mixed concrete industries found, during a recent Controllers Conference, that their individual practices vary widely from company to company. But they were unanimous in their belief that the work they do for management is vitally necessary for the operation of a sound business. Many companies in those fields, however, don't take advantage of the full assistance that their controllers can provide.

The 1961 Controllers Conference, sponsored by the National Sand & Gravel Association and the National Ready Mixed Concrete Association, brought out these facts through a vigorous exchange of information in forum-type sessions. They were held August 10 and 11 at the Edgewater Beach Hotel, Chicago, Ill. This meeting, the third in the recent series held by the joint associations, was tabbed the biggest and best conference held to date.

Here are some highlights that came from the 2-day discussions:

► Accountants and controllers should do a better selling job to management on the use of financial statements. Not enough accounting departments make analyses of financial statements available to management to point out trends.

► The investment broker and your local banker can help you in selecting financial sources and in properly investing surplus funds for the short term; see your banker often.

► Planning is the major factor in preparing and using cash-flow forecasts. Not enough companies use the facilities of budgeting and forecasting.

► Control of maintenance costs is one of the most important problems producers have, if they have large investments in equipment. These costs can account for 30 percent of production costs.

► There's no universal practice in industry for evaluating aggregate inventories.

Purpose of a financial or operation statement is to disseminate to the reader information concerning operation of the business. These may include the regular profit and loss statement and balance sheet plus several interim reports, which may be statistical or special reports on selected subjects. Interim reports give information that good management can't wait for in regular financial or operating reports.

Who gets these reports and how are they used? One company, whose accounting department prepares and distributes 120 pages of reports every month, generally sends all data to company officers and management. Sales data go to sales personnel. Cost data go to operating personnel, with plant superintendents getting costs on their plant. All cost data go to the plant superintendent.

As to form and content of reports, controllers noted that there is a problem in educating officials how to read and use the statements. Generally, detail included is a matter of judgement on how much will be used and valuable to those who get the reports. But they should be kept as simple as possible. Frequency of report making depends upon demands of the company and its length of operating period.

How to go public with your company and what a company can do in investing seasonal funds in short-term investment were fully covered by experts affiliated with A. G. Becker & Co., Inc., a Chicago investment broker house. There is not

Please turn to page 114

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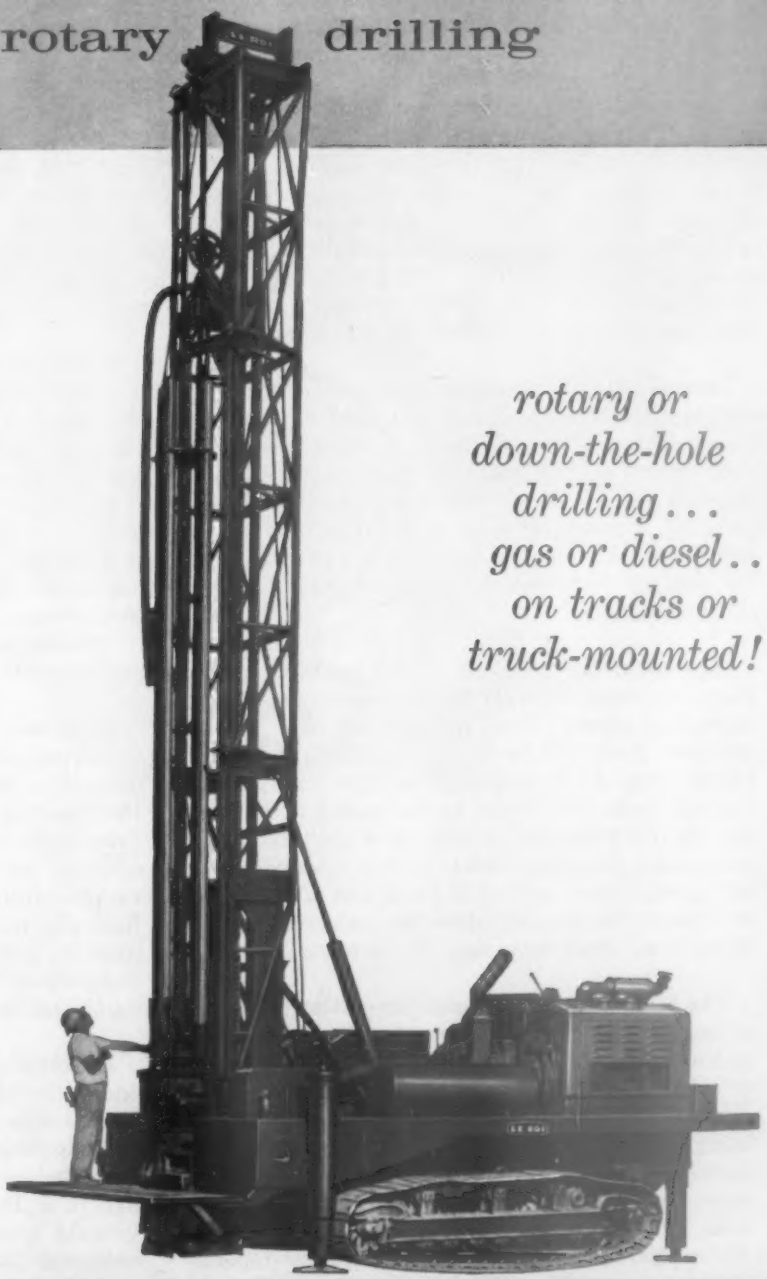
An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with such optional equipment as lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.



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Controllers exchange know-how . . .

continued from page 112

too much public ownership of aggregate businesses, and an explanation for it is that the public doesn't know and understand that business.

Four ways to invest seasonal funds were described. They included: (1) deposits in banks or savings institutions; (2) U. S. Treasury bills; (3) federal agencies, and (4) commercial paper. Whatever you do regarding loans or investment, talk to your banker, according to a specialist in construction financing affiliated with a Chicago bank. "Your banker," he said, "can help you much more than just making loans and holding your money."

Centralized cash management allowed one large company to conserve $4 million over a borrowing season. This was done by the head office assuming tight control over all cash in a highly decentralized company. It took much planning to do this job—planning a true cash flow and determining cash required for all uses and finding out what was left for capital. Deficiencies were provided for by short-term loans.

How could this company, which operates more than 100 plants with $120 million sales, save that amount of money? They reduced number of bank accounts from 120 to 12, and used three major banks. They check their cash balances on a yearly average basis, and review by the month and quarter. Equity financing or long-term debt requires long-range planning, which is now underway. It will cover a minimum of 3 years and will extend to 5 years. The plan will show the cash flow projections from which financing can be made.

The form on budgeting and forecasting included a case history of what one company does in making and charting for company personnel use. A series of eight forms was presented as exhibits. The accent is on short-range sales forecasting and budgeting, but sales also are projected for the long term. A general condensed report covers each category of sales and costs, and shows forecast data, actual data and data for the previous year, for comparison purposes. This, and other reports are well accepted by officials and production people alike. They are made available once a month.

A basic aim of maintenance programs and cost records is to have equipment ready when needed without reducing service to customers or hindering production operations. Records are not too difficult for a small operator, if equipment is concentrated. Larger operations, with equipment at various locations, must have such records with a preventive maintenance program. The forum leader on this subject summarized his presentation by stating that every company: (1) needs a preventive maintenance program for each major piece of equipment; (2) should instill a feeling of personal responsibility and pride in equipment for all; (3) should encourage prompt reporting of equipment defects; (4) should standardize on equipment; (5) must have cost accounting techniques, and (6) must have qualified maintenance specialists.

Taking an inventory of finished products is entirely mechanical and is basically an engineering problem. But evaluating such an inventory is another problem. Most do, and some do not, and there are advantages to both methods. There is less danger of overstating value of assets if finished product inventories are not assigned a value. Assigning values will show greater assets and working capital, and allow determination of accurate cost of sales. One of three methods may be used to determine value: cost, compromise value, or value of only salable materials.

More than 100 in attendance heard V. P. Ahearn, managing director of the two associations, bring up-to-date information on the financial areas of the Washington scene. He spoke pointedly of the President's tax bill and its various proposals. In addition, he described the tempo of Congress as varying from conservative to liberal to radical. Basically, he summarized, the whole future of this country, is bound up in the belief of people in the integrity of the federal government to honor all of its obligations.

Effective forum leaders of the successful conference included J. R. Spear, The Dolese Co., on financial statements; A. J. Selzer, Concrete Supply Co., on budgeting and forecasting; W. L. Warner, Houdaille Industries, Inc., on maintenance cost records, and W. F. Bayne, Union Sand & Gravel Co., on aggregate inventories. The panel on cash flow, investment and borrowing included Mr. Stoddard and Mr. Frackenthal of A. G. Becker & Co., Inc., Norman Anderton of Vulcan Materials Co., Clifford S. Nelson of Continental Illinois National Bank & Trust Co., and Mr. Ahearn.

The group voted to hold a full 2-day conference in Chicago, Ill., sometime during the latter part of August in 1962. **END**

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Belt conveyor system masters terrain

. . . and climate to build a giant dam in the high Alps

by Fred vonHillebrandt*

A MILE-LONG belt conveyor system is making it possible to build one of the newest of the world's great dams in Switzerland. The Grand Dixence Dam on the flanks of the renowned Matterhorn is rising 920 ft. out of a narrow gorge some 7,550 ft. above sea level. Base of the dam is about 720 ft. thick but it will taper to 70 ft. thick at the top which will measure about 2,300 ft. long. The calculated volume of concrete to be placed exceeds 7,583,000 cu. yd.

Under construction since the summer of 1953, the project will be completed well before the scheduled completion in 1965. Belt conveyor haulage has played a large part in stepping up the pace of placing concrete—for time is valuable during the relatively brief 150-day construction season between May and October. The five 40-in. belt conveyors in the system have been able to haul aggregates on a steady 2-shift, 21-hr. day at a rate of 1,350 tph., with belt speeds of 500 fpm. The

Please turn to page 119

*Vice president, Conti Rubber Products Inc., New York City

Thanks to the design of the mile-long belt conveyor system, the Grand Dixence Dam is ahead of schedule

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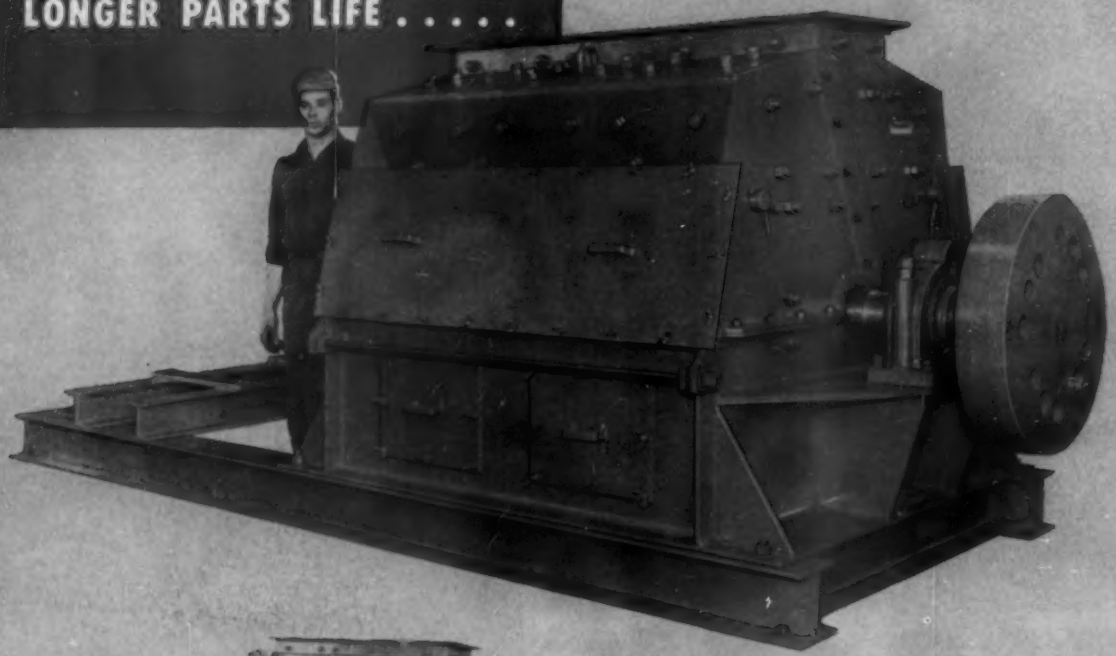

Williams Reversible Hammer Mill with cover open.
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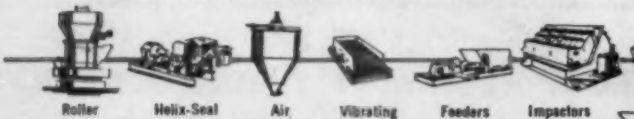

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Belt conveyor system masters terrain . . .

continued from page 116

years of 1957 and 1959 were particularly good years for the volume of concrete placed exceeded 1.3 million cu. yd. in each of those years.

The conveyor system was a major construction project in itself. It was necessary to drive an 11 x 13-ft. tunnel nearly a mile downhill through the live rock of the mountain. Since it was not possible to drive a straight tunnel, the conveyor system ended up in five segments.

Aggregates for the monster dam come from a moraine of the Prafleuri Glacier at the 9,200 ft. level. This is nearly a mile from the aggregates preparation plant at Blava and more than 600 ft. above it. The glacial till has been solidly consolidated by the mass of the receding glacier and it is being removed in benches. A pair of 2½-cu. yd. electrically operated shovels load 13-cu. yd. trucks for the short trip to a primary crusher.

All of the till passes through a 42-65 gyratory crusher set at 8 in. and drops directly to a 40-cu. yd. holding silo above an apron feeder. This unit feeds aggregates to a 48-in. wide speed-up belt that feeds material at the same speed and direction of travel as the first unit in the system.

While the glacial till ranges in size from boulders to silt, the size distribution of finished material averages out in this way:

Size—Inches	Percent
6 x 1½	50
1½ x ⅜	18
⅜ x ⅛	12
⅛ x 0	20

As in most high-capacity belt conveyor systems, the construction of the belt itself is critical to the success of the Grand Dixence aggregates handling setup. Originally, cotton duck plies were used in the belt carcasses. But in service the belts stretched to such an extent that the takeups at the discharge end of the belts could not keep the discharge trajectory within range of the next belt.

Exceptionally wet operating conditions made it difficult to maintain adequate friction contact between the belt and the single tail end drive pulley. For downhill operation, this is critical. Once the motor overcomes the inertia of the conveyor, it becomes a generator and the dynamic braking action prevents the belt from accelerating on the 7-deg. decline and running away with the load.

Hydraulic brakes take over if the electrical system fails and these brakes bring the belts to a gentle stop. However, with the excessive stretch of the cotton duck belts it was difficult to assure at all times that there would be enough friction contact between the belt and the drive pulley to control a fully-loaded conveyor.

Rather than increase the diameter of each drive pulley, the belts were replaced with 40-in. wide steel strand belts. Idlers were changed from the conventional 20-deg. troughing idlers to 30-deg. units since the new belts had enough lateral flexibility to do this. As a result, belt stretch has been eliminated, belt tension has been maintained, and the system has achieved more than 25 percent greater production.

Metal detectors are installed on two of the smaller belts in the secondary crushing system to protect the crushers from shovel teeth and other tramp metal. Since much of this metal is non-magnetic, the detectors are electronic—reacting to changes in the field of induction coils. The sensitivity of these coils can be varied over a wide range to permit the passage of harmless metal scraps without actuating the mechanism.

END

MAJOR EQUIPMENT REFERENCE

Quarry shovels, 2½-cu. yd. ..... Bucyrus-Erie Co.
Haulage trucks, 13-ton ..... Mack Trucks Inc.
Primary crusher 42-65 gyratory ..... Allis-Chalmers Mfg. Co.
Apron feeder, 48-in. ..... Pioneer Engr. Div.
Steelcord conveyor belts, 40-in. ..... Continental Gummi-Werke Aktiengesellshaft

Left: Aggregates are excavated from glacial moraine at the 9,200 ft. level nearly a mile from the dam's concrete mixing system

Right: Much of the vital conveyor system had to be housed in a tunnel driven through the mountain

Do you add phosphates to your slurries?

Here's a quick graphic way to check their concentration

by W. B. Chess, D. N. Bernhart & R. Gates*

TWO COMPLEX PHOSPHATE DISPERSANTS used as slurry thinners in wet process cement plants are increasing production at lower unit costs for several companies. Sodium tripolyphosphate and tetrasodium pyrophosphate, in many cases, will permit handling of raw slurry at considerably lower moisture content with no decrease in pumpability. (See ROCK PRODUCTS, May 1953, p. 64, for an article on results of use of sodium tripolyphosphate at a plant of Missouri Portland Cement Co.)

These polyphosphates present no difficulties in plant control. The phosphate may be added by dumping the dispersant in with a batch of clay as the slurry is made up in the wash mill, or by using a dry chemical feeder of the screw or vibrator type. It also can be added as a water solution. The amount of phosphate required is quite small, approximately .05 to .10 percent. Feed rates of 50 to 100 lb. per hr. are appropriate for a medium-size plant.

A colorimetric technique has been developed for getting a rapid, accurate analysis of the amount

Please turn to page 122

**Research Laboratories, Victor Chemical Works, Chicago Heights, Ill.*

ABOVE: Dispersants added in the clay wash mill are thoroughly mixed in the slip tank

BELOW: Complex phosphates used as slurry thinners in wet process plants can yield production economies

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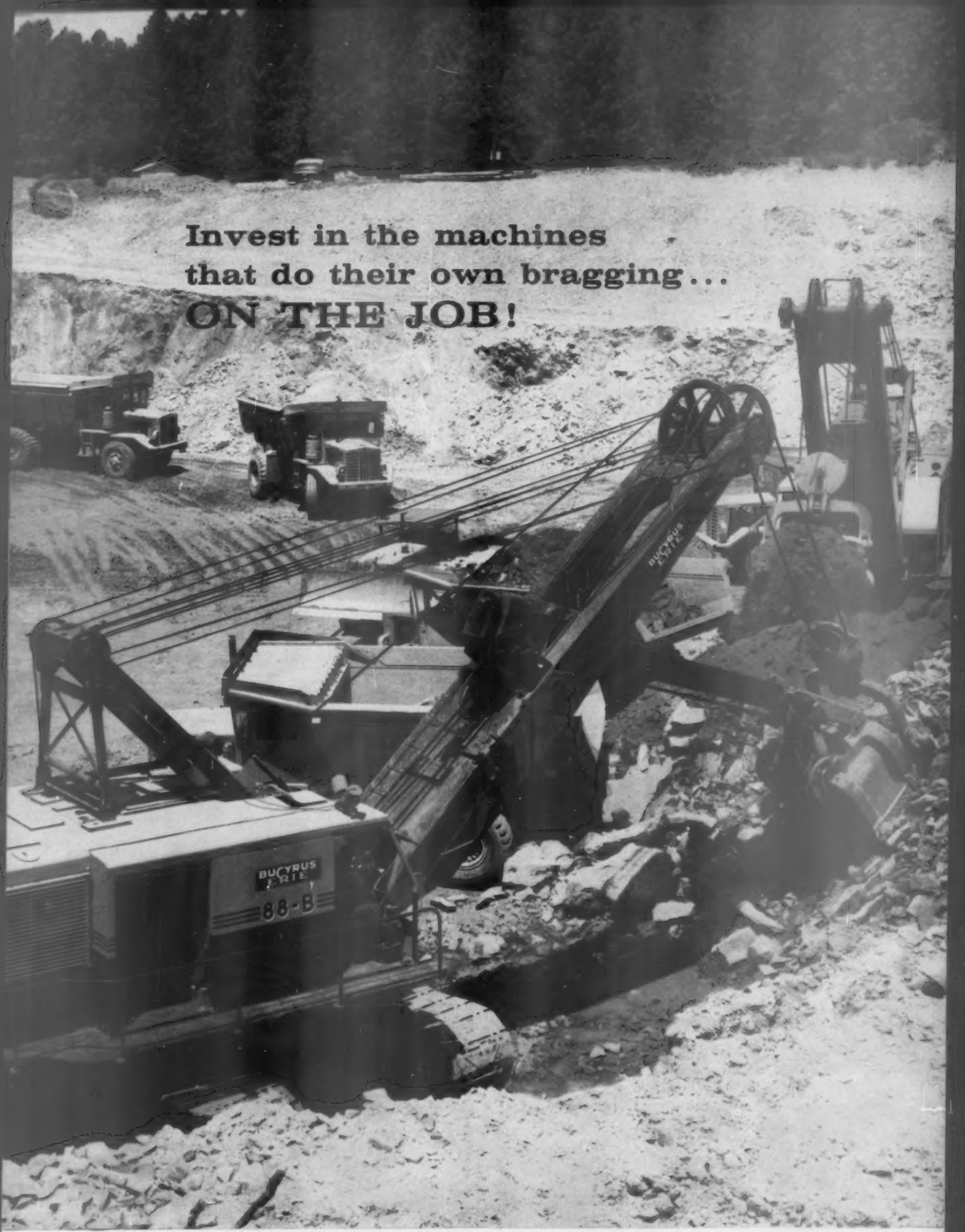


10E61

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin

BUCYRUS ERIE®

Do you add phosphates to your slurries?

continued from page 120

■ *Here's another example of where solving one problem raises another. Fortunately, the use of dispersants in cement slurries poses no insoluble problems. When complex phosphates are used to improve the pumpability of thick slurries, a colorimetric technique keeps track of the phosphates in the mix . . .*

of phosphate present in the total slurry. This technique is particularly effective in certain special cases where the rate at which slurry is made up varies or where the type of raw materials changes. Ordinary gravimetric methods are time consuming, and when measuring such minute amounts, the margin of error is quite high.

The cement slurries as received are thick, colloidal and impossible to filter. Therefore, leaching out of the soluble phosphates is impractical. Boiling with nitric acid changes the colloidal nature of the slurry, and the resulting course, crystalline precipitate can be filtered easily. At the same time, all phosphates are rendered soluble and hydrolyzed to the orthophosphate. Phosphate then can be determined colorimetrically by the "molybdenum blue" reaction.

There is usually a small amount of phosphate present in the raw cement slurry before any addition of polyphosphate is made. Therefore, phosphate in the raw slurry must be determined and subtracted from that found in the mixed slurry.

Determination of P_2O_5 in cement slurries requires the following supplies and procedures:

Reagents

Ammonium molybdate solution: Dissolve 18.8 gm. of ammonium molybdate, reagent grade, in 300 ml. of water. Add 150 ml. of sulfuric acid (98 percent) carefully. Cool and dilute to 500 ml. with water.

Standard phosphate solution A: Dissolve 1.9157 gm. of monopotassium phosphate (previously dried at 221 deg. F. for 1 hr.), in water and dilute to 1 liter; 1 ml.—1 mg. phosphorus pentoxide.

Standard phosphate solution B: Dilute 10 ml. of solution A to 100-ml. volume with water; 1 ml.—.1 mg. of phosphorus pentoxide.

Reducing agent

Dissolve 45 gm. sodium bisulfite in 400 ml. water. Dissolve 3.5 gm. sodium sulfite (anhydrous) in 50 ml. water and add .75 gm. 1-amino-2-naphthol-4-sulfonic acid (Eastman No. 360 without further purification is satisfactory). Mix the latter solution until the acid is dissolved. Then add to the bisulfite solution and dilute to 500 ml. with water.

Procedure

Weigh 5 (± .01) gm. of sample into a 400 ml. beaker. Add approximately 25 ml. water and 15 ml. HNO_3. Boil 10 to 15 min. Cool, then filter through S&S No. 604 filter paper into a 250-ml. volumetric flask. Dilute to volume and mix thoroughly.

Transfer a 10-ml. aliquot to a 50-ml. Nessler tube (or graduate or volumetric flask). Using another Nessler tube, carry through a blank, using 10 ml. water in place of the aliquot. Add 2 ml. molybdate reagent and 1 ml. reducing agent to each tube and dilute to 50 ml. with water. Let stand 10 min. and not more than 20 min.

Using B and L or similar colorimeter reading at 730 millimicrons, set the blank at "O" absorbance and read absorbance of the samples.

Prepare a standard curve with the same quantities of reagents and 0, 1, 2 and 3 ml. of standard solution B, in place of the sample aliquot. Plot mg. P_2O_5 against absorbance obtained.

Calculate the mg. of P_2O_5 in the sample from the standard curve.

$$\frac{\text{mg. } P_2O_5 \times 100}{\text{mg. sample (200 in this case)}} = \text{percent of } P_2O_5$$

Percent of sodium tripolyphosphate is equal to: $\frac{\text{percent of } P_2O_5}{.58}$ or

Percent of tetrasodium pyrophosphate is equal to: $\frac{\text{percent } P_2O_5}{.53}$

Sodium tripolyphosphate has been determined on a number of samples of cement slurry from various sources, to which known amounts of the phosphate have been added. The results appearing in Table I were obtained from one of these slurries.

The authors wish to acknowledge the help of T. Hinkes in obtaining and preparing slurries for analysis and for testing this process in the field. END

TABLE I—Percentage of tripolyphosphate deviation

Tripoly added	Tripoly found	Difference
.020	.017	—.003
.040	.039	—.001
.050	.052	+.002
.060	.056	—.004
.120	.116	—.004
.140	.133	—.007
.220	.224	+.004
.240	.232	—.008

Average deviation: .0026 percent

Enter 1466 on Reader Card

HOW TO PULL A TOE

(WITHOUT PUSHING YOUR COSTS)

Wyandot Dolomite, Inc. (Carey, O.) was getting an erratic but fairly consistent toe at the bottom of the quarry face after each blast.

This meant expensive additional shooting, wear and tear on the shovel, reduced payloads in the haul trucks.

Du Pont was called in. What recommendations could we offer?

The answer turned out to be a *combination* of quarrying products.

1. Into the bottom of each hole went Tovex®—non-nitroglycerin gelatin that comes in flexible polyethylene bags. It slumps, fills the entire diameter of the hole to give maximum density at minimum cost.

2. Next came Nitramite® 2. This is one of Du Pont's new nitro-carbo-nitrate blasting agents. It fills the need for a quality, medium-low-price product for loading wet holes of medium and large diameter.

3. The remainder of the water-filled portion of the hole was topped up with "Tovex".

4. Completing the load were several decks of Nilite® 101—Du Pont's new pre-mixed, free-running product of medium density ideally suited for dry holes from 2" diameter up.

5. HDP-1 Primers were used to prime the various decks of blasting agents in the hole. HDP Primers are new high-detonation pressure units especially designed by Du Pont for initiating non-cap-sensitive materials.

6. Primacord* and Du Pont MS Delay Connectors primed the shot.

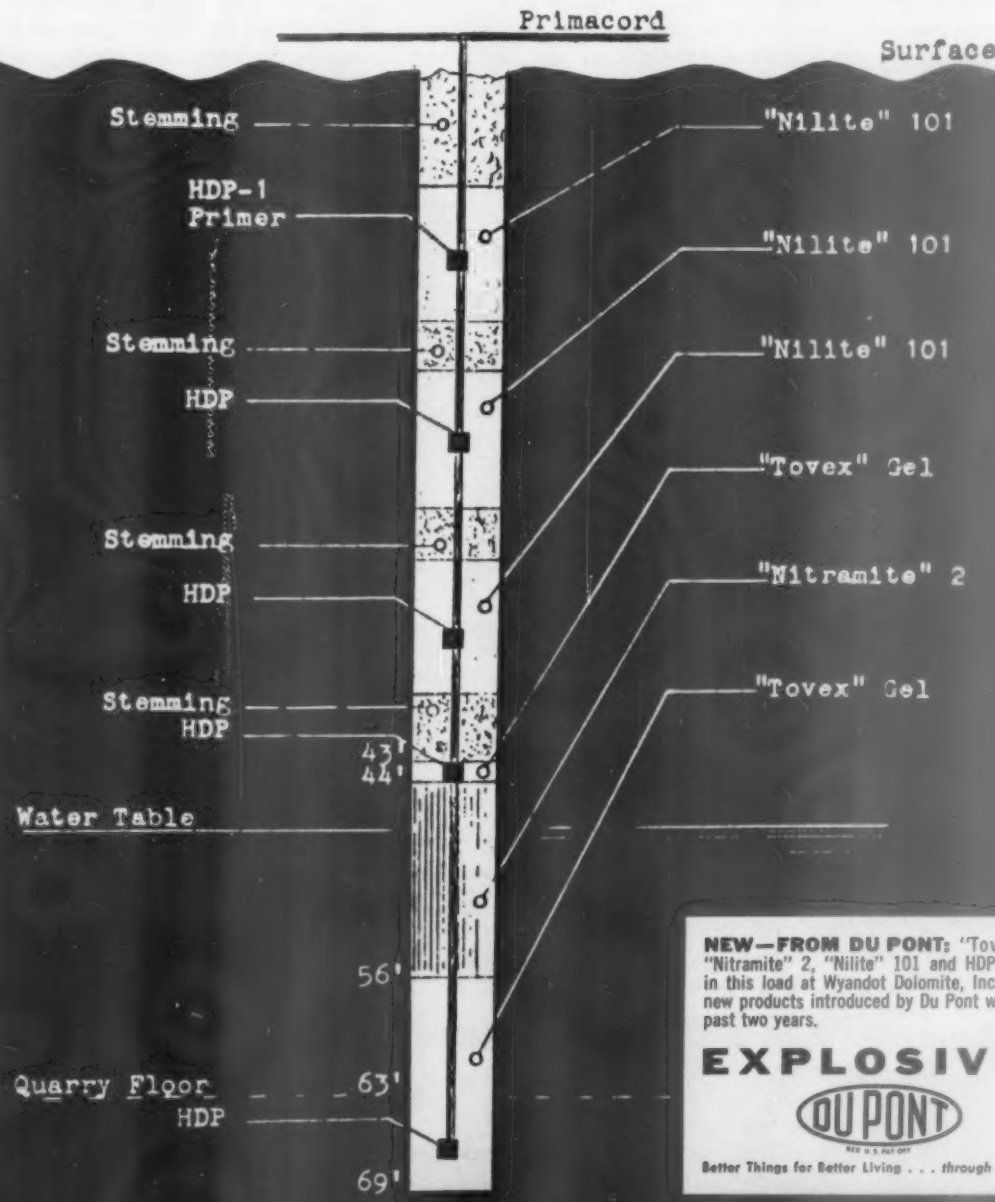
Safest technique. This combination of non-nitroglycerin blasting agents not only removes the toe effectively and provides a higher average daily production, but it is also one of the safest blasting techniques known today.

5½¢ per ton. Yet, by using a team of products which combine low cost and high Du Pont quality, the cost is only about 5½ cents per ton of rock removed.

What's *your* problem? Can we help you pull a toe? Or show you some other way to break more tons per dollar?

Ask your Du Pont Explosives Department representative or distributor for details. Or write Du Pont, 2444 Nemours Building, Wilmington 98, Delaware.

*Registered trademark of the Ensign-Bickford Company.



NEW—FROM DU PONT: "Tovex" gel, "Nitramite" 2, "Nilite" 101 and HDP Primers in this load at Wyandot Dolomite, Inc., are all new products introduced by Du Pont within the past two years.

EXPLOSIVES

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living . . . through Chemistry

Cut your hardfacing budget . . .

continued from page 97

dealers for a number of manufacturers of earth-moving machinery. Nearly all rebuilders today guarantee satisfactory service life of the parts they restore; the gamble has largely been taken out of the process.

These rebuilders usually offer an added service on crawler equipment. Worn rollers and idlers are taken in on an exchange basis for either new or rebuilt replacements that are immediately available. This arrangement eliminates waiting and the consequent loss of production time. Furthermore, few shops now confine themselves to simple restoring of wearing surfaces. By the time a tractor roller, for example, has suffered severe wear it is almost certain that bearings, bushings and seals are ready for replacement, and only when a part has been completely reconditioned can a worthwhile guarantee be offered. It should be noted that most automatic shops are equipped to handle complete parts renewal jobs; many have overhaul facilities for the entire machine—from running gear to engine and hydraulic systems.

Many operators of heavy equipment have found it economical to stock extra sets of those parts requiring frequent replacement. Then the worn parts taken from service for rebuilding can be replaced immediately with minimum loss of production time. The worn parts are brought back to serviceable condition, put back in stock and held in readiness for re-use.

Local welding supply dealers usually have lists of automatic welding shops in the area they serve and can furnish full information on the facilities available in each shop. Another source for such information is, of course, the manufacturer of the original equipment, who is always glad to advise the owner on all phases of maintenance.

It is, of course, impossible to quote exact price schedules for rebuilding of various types of equipment, since these figures differ in different sections. Of one thing you may be sure: wherever properly equipped shops with competent workmen are available, the automatic process can effect sizable savings in your operating costs. In general, you may expect service life of properly rebuilt parts, compared to that of new parts, to be in approximately the following proportions: crusher shells, 2 to 1; cones and mantles (hardfaced new and worn to destruction, the recommended procedure), 2 or 3 to 1; tractor rollers, 1 to 1; tractor idlers, 4 to 1; track links, 2 to 3; shovel house rolls at least 4 to 1.

Rocky's Notes

continued from page 24

it ever so violent as to throw off any effluvia that the calcareous earth did not intercept in its escape, so that no offensive smell was ever perceived. In October the whole heap was carried out and applied to one-sixth of an acre of wheat—and the effect produced far exceeded that of calcareous manure alone, which was applied at the same rate on the surrounding land. No such power as this experiment indicated, however, will be expected from clay.

"Quicklime is used to prevent the escape of offensive effluvia from animal matter; but its operation is entirely different from that of calcareous earth. The former affects its object by 'eating,' or decomposing the animal substance (and nearly destroying it as manure), before putrefaction begins. The operation of calcareous earth is to moderate and retard, but not to prevent putrefaction—not to destroy the animal matter, but to preserve it effectually by forming new combinations with the products of putrefaction. This mode of using calcareous earth might be practiced to great advantage near towns where carcasses and other animal matters are so abundant as to be a public nuisance."

His theme is that it is not the calcareous earth as such that gives soil fertility, but its ability to capture and decay organic matter in the soil. Hence, it is necessary to use barnyard manure or plowed-under vegetable matter (green manure) with the calcareous material, or rather before using it. He was quite well aware of the acidity of some soils, how to determine it, and the power of lime to neutralize it. However, he contended that an acid soil preserved the soil elements, and the application of his marl gave best results on such acid soils, because the components of the acidity were essential to plant growth. Limestone soils, or those originally limestone, were often nonproductive because they lacked these products of putrefaction. He analyzed several such soils from the western part of the state, and found they had lost their power to produce economically,

Please turn to page 126

only one moving part makes dependable percussion drilling power

The piston is the only moving part, which means less wear and less trouble. No complicated valving to sand up as in many bottom hole pneumatic impact tools. You can easily change the choke which adjusts the Hammerdril to the air volume needed from your 100 psi compressor. The Series 100 Hammerdril® is an air miser, too. All the air goes through the Hammerbit® to clean or to drill. None is wasted. This splined, one piece Hammerbit has heavy tungsten-carbide inserts for long life. Service is available in your area. Write for new bulletin.

MISSION MANUFACTURING CO.

HAMMERDRIL

P. O. BOX 4209 · HOUSTON, TEXAS / OVER THIRTY YEARS OF DRILLING RESEARCH

Rocky's Notes

continued from page 124

having used up all the available organic matter they had once contained.

This point is emphasized in the following quotation: "The most important and valuable operation of calcareous earth gives nothing to the soil —but only secures the other manures, and gives them wholly to the soil. In this respect the action of calcareous earth on soils is precisely like that of mordants in 'setting' or fixing of colors. When alum, for example, is used by the dyer for this purpose, it adds not the slightest tinge of itself —but holds to the cloth and also to the otherwise fleeting dye and, thus, fixes them permanently together. Without the mordant, the color might have been equally vivid, but would be lost by the first wetting of the cloth."

Of course, by modern theory and experience Ruffin was in error when he assumed that the liming material added nothing to the soil (presumably in the way of plant nutrients). Hence he was wrong in his conclusion that one liming would last indefinitely. He was probably wrong in some of his other theories. Nevertheless, he was so down-to-earth and so enthusiastic about what he had accomplished through his experiments and experience, that the modern reader will find much of interest, and so far as we can recall, much that has been overlooked or taken for granted in modern texts on the subject. Anyhow, reading Ruffin's book has been most entertaining and suggestive, and may well give the producer of agricultural liming materials a new slant, even though it comes in a century-and-a-half-old book.

How to pick a maintenance man . . .

continued from page 85

Lubricants are so vital that every first-rate maintenance man should have at least a working knowledge of them in order to cut down operating costs and repair bills. This knowledge need not extend to technical skill, but it should include a basic understanding of the various lubricants and their uses, and how and when to lubricate.

Does your maintenance man throw away the bulletins and manuals that equipment manufacturers so generously provide? New products and techniques are constantly shoving old practices into obsolescence, and a responsible maintenance position is not for the man who will not study, who will not grasp at every bit of information he can find. A natural desire to study is a very important virtue in your maintenance man.

Last but not least among his assets should be supervisory ability—the ability to communicate and to demonstrate. And when you find a man who can perform all these functions, hang on to him—he's up in the ranks of your most valued employes.

Aggregates production at dams . . .

continued from page 96

⅜ x ¼-in. gravel to sand. Sand then was classified in three classifiers. Primary crushing of oversize was by a 42 x 36-in. jaw crusher augmented by cone crushers.

The dam was named after the eternally snow-covered mountain peak that can easily be seen from the dam site. At one time the general area was one of the nation's most important copper mining districts and supported several large copper smelters. Arsenical smelter fumes killed off practically all vegetable life and denuded great areas. Even today the nearby mountains are mostly bare. The largest smelter of the several was at Kennett, now completely submerged by the water behind the dam.

I suffer slightly from nostalgia when this subject is discussed. During World War I, I was assistant superintendent at the Kennett operation which included large electrolytic metal recovery plants. A daughter was born in the town, a town that does not now exist.

Many tourists visit Shasta yearly. A small amphitheater is available, and the visitors hear about the dam and related features. Reference is often made there ". . . to the hell-raising mining camp of Kennett, now under 400-ft. of water . . ." But we want to set the record straight. Kennett was one of the best and most orderly towns in the west. When we "called" a Bureau of Reclamation speaker on this point, he said with a laugh, "Oh, we have to feed them a little hooey once in a while."

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Arnold Abbrot, with over 20 years' experience with the Kaiser Company, supervises the Kaiser Radum plant, one of the industry's most modern and efficient. Plant handles a feed of 1200-1300 TPH rock, gravel and sand.

KAISER specified WEMCO for RADUM plant

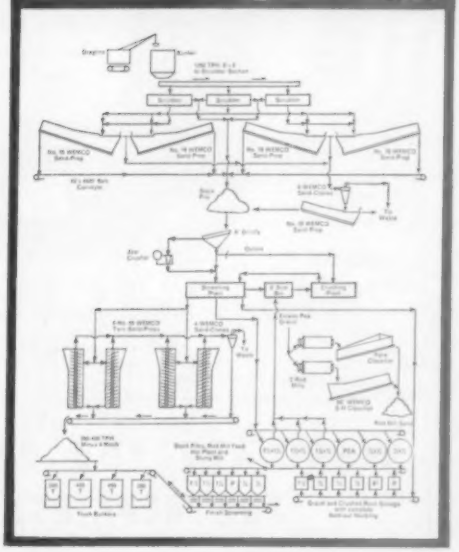
Maximum efficiency in equipment— and operation—pays dividends

Since it first began production in 1930, the Kaiser Radum Plant, in Pleasanton, California, has had a continuous record of successful operation. Capable management, a progressive program of modernization and expansion have made it one of the industry's largest—and most efficient.

Because of its record of outstanding, profitable performance in major aggregate plants, WEMCO equipment was selected for modernization of this 1200-1300 TPH sand and gravel plant. Four #78 WEMCO Sand-Preps receive material from scrubber section. Four #48 Sand-Preps wash and classify all #4 minus concrete sand (350-400 TPH). A #60 WEMCO Sand-Classifier (installed in 1952) handles rod mill discharge. Eight WEMCO Sand-Clones process Sand-Prep overflow water for recovery of fine sands.

High capacity trouble-free WEMCO equipment combined with Kaiser's advanced production, flexible handling and blending techniques, enable the Radum Plant to meet even the most recent specifications and the demands of a highly competitive market.

Another example of WEMCO and the Industry's forward-looking companies working together for the future. A WEMCO engineer can provide answers to your aggregate problems. Better quality . . . greater profits.



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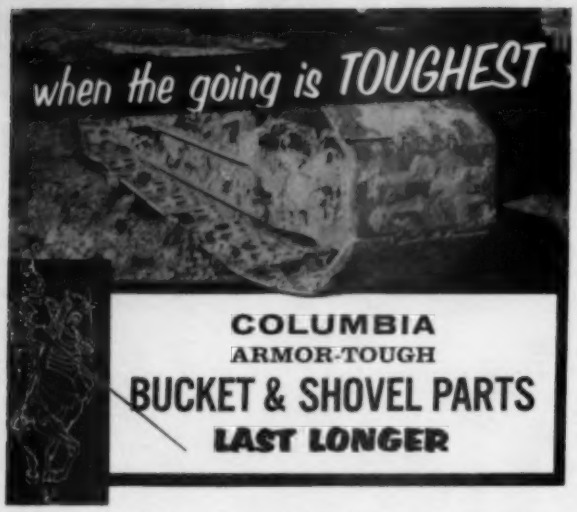
PUMPS



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Get the full story on Columbia Armor-Tough Bucket and Shovel Parts. WRITE for Bulletin #1067.

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WILFLEY centrifugal PUMPS

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WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the **"WHERE TO BUY"** *Section*

NSGA Board Meeting . . .

continued from page 110

sand and gravel and do not come under the mining laws. This law has virtually tied the hands of western operators in obtaining deposits for future excavation, since virtually all sand and gravel on western lands is publicly owned. It has been suggested that the difficulty may be overcome by leasing public lands administered by the Bureau of Land Management. There is objection to this since there is the possibility that future ordinances could deny the use of land and reserves. Ownership of land in fee simple is considered the better method to arrange for future reserves in the west, but would require a change in Public Law 167.

The Board accepted the recommendation of J. R. Henderson of Las Vegas, Nev., to appoint a committee that will study the problem further and report to the Board at its February 1962 meeting.

The February 1962 Convention & Show will be the largest ever produced for the industry. It will be held February 4-9, 1962, at McCormick Place in Chicago, Ill. Total available space for the exhibits at the NSGA-NRMCA Show is 96,000 sq. ft. net (150,000 sq. ft. gross), which compares with 63,000 sq. ft. sold for the 1960 show. More than 125 exhibitors already have placed requests for 80,000 sq. ft. of exhibit space, and indications are that the entire available space will be sold.

All registration will be at McCormick Place, where all meetings except those on Friday morning, February 9, will be held. Bus service will be available between the Conrad-Hilton Hotel and McCormick Place on a 10-min. schedule every day.

The Association has reserved a block of 2,200 rooms in the Conrad-Hilton Hotel and 450 rooms in the Pick-Congress Hotel to serve convention goers. The temporary convention schedule is:

Saturday, February 3—Meeting of Committees and Exhibit Division.

Sunday, February 4—Annual meeting of Manufacturers Division.

Monday, February 5—NSGA and NRMCA Board Meetings, Joint Luncheon.

Tuesday, February 6—General sessions, morning; Open for exhibits, afternoon.

Wednesday, February 7—General sessions, morning; Annual joint luncheon, noon. Open for exhibits, afternoon.

Thursday, February 8—General sessions all day. Show closes.

Friday, February 9—General session, morning.

The next mid-year meeting of the NSGA and NRMCA Boards of Directors is scheduled for the Broadmoor Hotel, Colorado Springs, Colo., probably during July 1962. **END**

Re-Usable Armco Corrugated Steel Structures Are Sturdy, Economical

Sturdy—Conveyor tunnels made of Armco MULTI-PLATE® or Liner Plate easily withstand the tremendous weight of aggregate piles. They gain their strength from material properly compacted around them. They won't crack or break.

Economical—With either Liner Plate or MULTI-PLATE your own crews can quickly bolt the plates together. The structural bolts make ideal utility line hangers. Hoppers are easy to install. And you can relocate any Armco Structure . . . many times over.

For complete information on the economy of Armco Corrugated Metal Structures, just fill in and mail the coupon. An Armco Sales Engineer will provide it with no cost or obligation to you.

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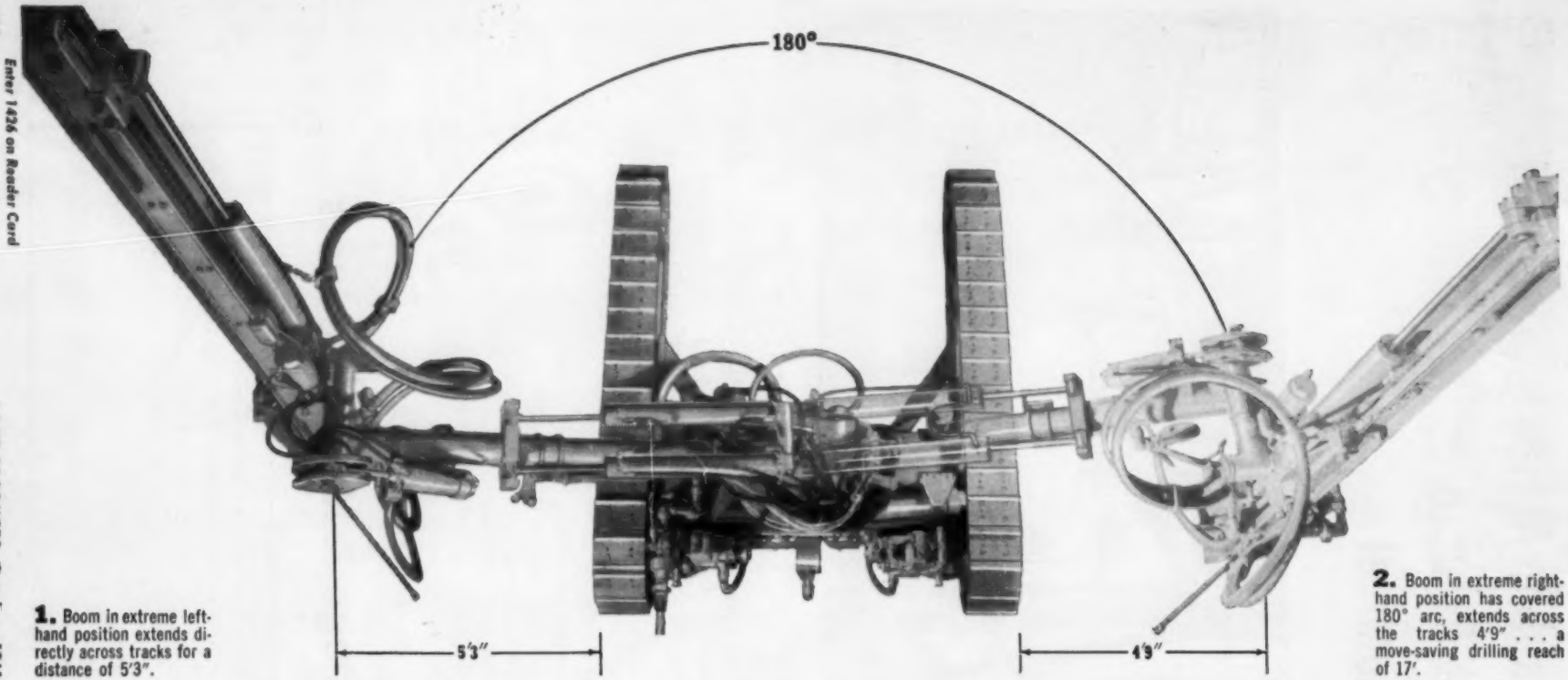

1. Boom in extreme left-hand position extends directly across tracks for a distance of 5'3".

2. Boom in extreme right-hand position has covered 180° arc, extends across the tracks 4'9" . . . a move-saving drilling reach of 17'.

TRACDRIL'S 180° "BOARDING HOUSE REACH" PAYS-OFF!

More and more mining men are discovering that with the full 180° ground coverage of the G-900 Tracdril fewer moves are needed . . . that more blast holes can be drilled from every set-up.

In addition to the time-saving advantages of their 180° "Boarding House Reach", new G-900 Tracdrils have already gained an outstanding reputation for:

- Extra-long crawlers, 1350 sq. in. ground contact and knee-action . . . that take bad footing in stride.
- Remarkable ability to shift from straight verticals . . . to high horizontals, 11 feet at the face . . . or to snake holes at ground level.
- The time and step-saving advantages of two sets of grouped controls . . . one at turret, one at boom end.
- Heavy-duty brakes that lock and hold automatically the instant tramming throttle is released.
- You'll want a copy of Bulletin SP-3267 for G-900 specs, operating diagrams and dimensions. Write to:

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When Will YOU Crush With The TORNADO?

Hundreds of plants now use the Tornado Square Impact Crusher to turn out a dense graded cubical product, at FAR LESS COST per ton than with rod mills or other types of crushers priced up to TEN TIMES AS MUCH.

Among the reasons why YOU should test the Tornado soon, is its versatility. Produces any range of crushing, to screen to any gradation desired, in an almost unbelievable number of tons per hour.

Virtually no "down time". You can keep it in operation 22½ hours a day, 7 days a week, year after year. Light in weight, requires no massive foundation and little head room. Power requirement amazingly low. No zincing, babbitting, or water cooling needed.

What this user says is important to you:

LORAIN ELYRIA SAND COMPANY
840 IDAHO AVENUE
LORAIN, OHIO

Gentlemen:

This is to express our complete satisfaction with the manner in which our Tornado Impact Crusher is operating and, also, with the product it is producing.

As you know, we are extracting an extremely dense aggregate with an unusually low abrasion loss from Lake Erie. To my knowledge, we are the first to reprocess this material through a plant.

We have experimented with other impact crushers and have found that they were unable to produce satisfactory quantities of crushed aggregates at an economical cost. The Tornado is doing the job and giving us a crushed product which easily meets State of Ohio specifications.

I, also, wish to offer my congratulations on the alert way in which your Company's personnel have assisted us in obtaining optimum results.

Cordially,

LORAIN ELYRIA SAND COMPANY

J. A. Couture
Vice President

Write, wire, or phone collect for details. We'll run a sample of your material through the Tornado to PROVE how much it will do for you.

TOM BRIDGEWATER
WERCO
Steel Company

2151 East 83rd Street, Chicago 17, Ill., Phone ESsex 5-8446, Cable Address, IMPACTOR

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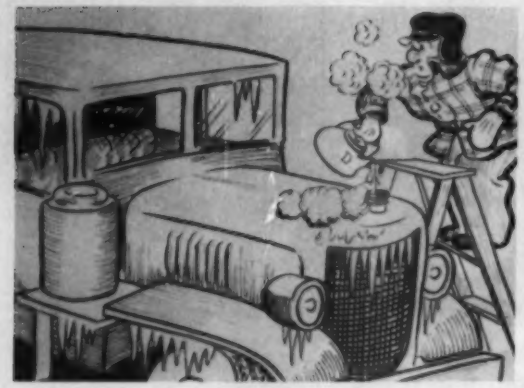
TRUCK TALK

by Chet Cunningham



It's time to start making your plans for winter again, and they should include a healthy amount of work on winterizing your delivery, long haul and rock producing rigs.

Most rock outfits have a set pattern of fleet winterization. Yours may be good, it may be hit-or-miss, or it may be on the books but not put into practice. Now is the time to take out your winterization plans, give them a working over and see if they are doing the job that needs to be done. Try to plug up all the holes you can find, and improve your system. Here are some suggestions that other shops have found workable:

► Electrical System: Remember that a battery works harder in winter due to increased demands on it because of the cold weather. So check the charge on each battery cell, check the generator, the cranking motor, voltage regulator, lights and wiring. Adjust the voltage regulator to be sure it is supplying as much juice as your battery drains under normal operation.

► Fuel System: Drain and flush the fuel tank of your trucks as well as all fuel lines. Clean or replace the fuel filter if you use one, and give your carburetor a good check or reconditioning.

► Engine: Drain your crankcase and refill with the lighter winter oil that is recommended for your area.

► Cab: Replace any broken glass, check windshield wipers, heaters, defrosters and give the cab a good interior cleaning.

► Body & Chassis: Remove all rust, and touch up the spots. Repair any sheet metal that needs it, and repaint if necessary.

► Accessories: Check operation of the radiator shutters and thermostatic fans if your rig has them. Make repairs or replacements on any accessories that need them.

► Hydraulic System: Drain and flush the whole system. Then refill with the recommended hydraulic fluid for that rig.

► Air System: Blow all water from your air tank lines on your rigs with air brakes. Then install an alcohol vaporizer to prevent a possible air line freeze up.

► Cooling System:

Drain radiator, engine block, all heaters. Remember, there may be more than one drain point on the engine these days.

Flush the system, and use a cleaner if needed. Be sure to remove the thermostat before flushing so water will circulate through the entire system.

Check operation of the thermostat in a pan of hot water to be sure it opens and closes at the desired temperatures.

Check for malfunctioning radiator cap, hoses, gaskets, drain cocks, plugs, fanbelt, fan and water pump.

Determine antifreeze protection required. Add proper quantity of antifreeze, then fill with water until tank is almost full. Start motor and check all hoses and leak points again.

Blow dirt out of the radiator fins.

Allow filled radiator to warm completely, then check with hydrometer for cooling protection.

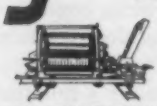
Be sure to install new shims when mounting crawler track rollers. If new ones are not available, and the old ones must be used, buff them clean before re-installing. This is needed because of rust on the shims. This rust can vary up to half the thickness of the shims themselves.

If the old shims are put back in, without buffing, they will not give you the desired uniform preload because the old rust pattern has been disturbed. An easy way to buff shims is to lay them on a wooden board as a support, then buff. END

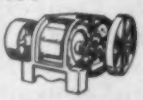
GRINDING COSTS PER YARD GO DOWN

When you install the American #9 Grinder in your plant for the reduction of lightweight aggregate, cinders, haydite, pumice, slag or other mine and quarry products. Owners report over 30 yards per hour and maintenance costs of less than 1¢ per yard. It grinds wet or dry material with no screen plates required. Suspended mullers are adjustable to volume and size requirements. Heavy-duty construction assures years of trouble free service. Get all the facts on the #9 soon—lower costs mean greater profits.

American
CLAY MACHINERY


ELECTRIC CUTTERS

SMOOTH ROLL CRUSHERS


DISINTEGRATORS

PUG MILLS

GRINDERS

DE-AIRED COMBINED MACHINES

DIVISION OF
HUBER-WARCO COMPANY - Marion, Ohio, U.S.A.

Do Your Job the AMERICAN way

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In Cement and Aggregates the Word for Air Separation is "Sturtevant"

in cement...

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates...

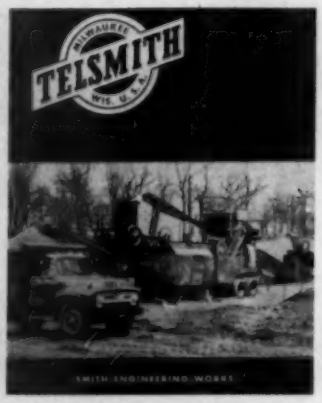
Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
102 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators
Enter 1417 on Reader Card

NEW LITERATURE

For free information on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Portable plants

Smith Engr. Works Div., Barber-Greene Co., has released a bulletin covering its line of closed-circuit portable plants. All the major equipment in these plants—crushers, screens, feeders, conveyors—are described. These mobile plants are moved from job to job and produce tonnages as high as 300 tph. Production of up to 3 sizes of material is permitted with these plants. The booklet describes a wide range of the company's other portable plants, designed in various combinations to meet specialized applications.

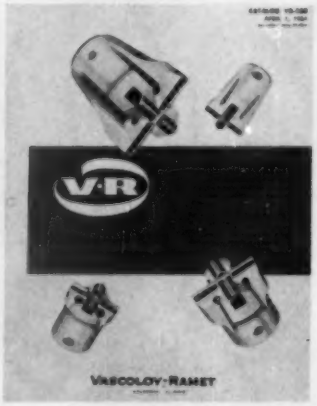
Enter 700 on Reader Card

Dry-fluid drive

Dodge Mfg. Corp. explains a simplified method for selecting dry-fluid drives and couplings for most industrial applications in a 20-page catalog. Eight stock drives and 11 stock couplings are listed for fractional to 1,000-hp. requirements, together with actual installation photographs, product pictures and engineering drawings. The bulletin contains tables of weights, dimensions and prices, two types of cutouts to shut off motors and tables of recommended V-belt drives. Included are couplings with higher torque capacities for given outside diameters.

Enter 701 on Reader Card

Percussion bit catalog



Vascoloy-Ramet Corp. covers a complete line of carbide-tipped percussion bits for all types of rock drilling, quarrying and open-pit mining in an illustrated catalog. These bits are used on all types of percussion drilling equipment. Carbides are developed by the company to provide cutting of round blast holes under all drilling conditions. Charts in the catalog contain data on each bit to aid correct selection. The company's line includes bottoming and shoulder bits, down-the-hole bits and push-on style bits. All are available in a wide range of diameters.

Enter 702 on Reader Card

Please turn to page 138

It's the distance between your plant and ours.

All a matter of numbers and geography, of course. Bemis has seven plants making multiwall bags for the cement industry. And they're strategically located, as the map shows.

So, it follows that we have more bag plants closer to more cement plants than does any other manufacturer. And *short delivery hauls mean fast service.*

Also, a *network* of plants means flexibility . . . if one of our plants gets in a bind, there's another conveniently close to take care of your needs promptly.

As for sales-service, there are 29 Bemis sales offices . . . another big plus in efficiency and convenience.

To round out the picture, Bemis makes any type multiwall bag that the cement industry may need. Like to try our product and service? Just call or write.

It's just good business to take the shortest distance to service.

Bemis

where packaging ideas are born

General Offices—408-M Pine Street, St. Louis 2

Enter 1422 on Reader Card

STABILITY
MOBILITY
VERSATILITY
EASY OPERATION

4 reasons why operators prefer the ALL-NEW, ALL-HYDRAULIC 350 REICHdrill

CRAWLER-MOUNTED C-350

NOMINAL HOLE SIZE—1⅞" to 5⅝" • DOWN PRESSURE—10,000 LBS. • ROTARY SPEED TO 540 RPM

Easy Operation is assured by all-hydraulic, labor-saving controls. *Stability* is provided by 14" wide tracks, low center of gravity and 8'8" wide frame plus 3 REICH heavy-duty hydraulic leveling jacks. *Mobility* is high because the crawler-mounted 350 trams at 7.8 MPH; climbs 25% grades, turns in its own length. *Versatility* is basic in REICHdrill design. The 350 is at home blastholing with 3-cone rotary bits, In-Hole Drills, or drag bits; coring or prospecting.

A truck-mounted T-350 REICHdrill for greater mobility with all the above advantages, is also available. Get detailed specifications.

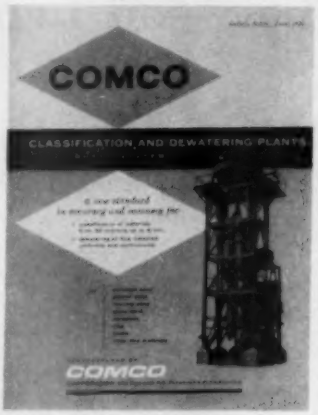
Ask for SP-5001-2

REICHdrill
FRANKLIN (VENANGO COUNTY), PENNA.
Division: CHICAGO PNEUMATIC TOOL CO.

Enter 1441 on Reader Card

New Literature

continued from page 136



Classification & dewatering plants

Comco Corp. has released a 6-page bulletin that describes the operation and performance of a new compact classification plant. The plant operates automatically, without operators and without power (except for pumps). Flow diagrams, accuracy curves and engineering descriptions are included in the bulletin. Dewatering components are also described in the bulletin.

Enter 703 on Reader Card

Impact crushers

Lippmann Engr. Works, Inc., is offering an illustrated bulletin that discusses the company's complete line of crushing, screening and conveying equipment. Featured in the bulletin are the company's impact crushers for primary or secondary crushing and stationary or portable use. Specifications and illustrations for both crushers are given.

Enter 704 on Reader Card

Ball bearing idlers

Webster Mfg., Inc., has announced a new bulletin describing the company's line of medium-duty ball-bearing belt conveyor rolls. Both troughing and return idlers are presented in the bulletin, which lists dimensions and weights for 4 and 5-in. trough and return idlers for belts ranging from 18 to 36 in. in

width. This line of idlers was developed for general-purpose belt conveyor installations for materials handling duty. All roller assemblies are of equal length and are interchangeable. The rolls are made of heavy gauge tubular steel with cast ends; the ball bearings are double sealed and require no lubrication after leaving the factory.

Enter 705 on Reader Card

Plate feeder bulletin

Chain Belt Co. announces the publication of a 7-page bulletin describing its reciprocating plate feeder. This feeder is designed to feed a variety of materials economically from a bin or hopper. The feeder allows a steady, even flow of material onto a conveyor or into allied equipment. The feeder is available in a number of sizes to meet specific needs.

The bulletin contains outlined drawings, dimensions and selection aids covering the standard line. It also lists feeder specifications such as capacity, horsepower, etc., and features the five types of eccentrics available for the feeders.

Enter 706 on Reader Card

Dust control bulletin

Pangborn Corp. describes a number of effective methods for controlling industrial dust and fumes in a new 20-page bulletin. The bulletin is prefaced with a non-technical explanation of the advantages available through proper dust control, and lists basic essentials comprising a typical dust control system. Each collector is described and illustrated with photographs and line drawings. Included are the electric-furnace exhaust hood and the cloth-tube collector, used in high-temperature, corrosive-gas applications.

Enter 707 on Reader Card

Please turn to page 141

MULTIPLY ROLL LIFE 5 TO 10 TIMES

hardface with Amsco's "Pair for Wear"

Impact and abrasion take their toll of crusher rolls. Hardfacing requirements vary, but one user reports roll life increased 5 to 10 times by rebuilding with Amsco hardfacing electrodes.

See for yourself how Amsco's "Pair for Wear" electrodes cut your rod inventories and let you handle 90% of hardfacing jobs with just two rods—Nicro Mang* and X-53.

Nicro Mang is a low hydrogen type composite extruded electrode that replaces stainless steel. It lets you weld manganese as easily as mild steel. X-53 is used for general hardfacing and has a high deposit rate with no spatter.

Try the Amsco "Pair for Wear" on your job by writing for your free sample kit. Or, see your leading welding distributor. He carries Nicro Mang and X-53 in 50 lb. manual packages or 50 lb. semi-automatic coils.

* TRADEMARK REGISTERED

561

AMERICAN Brake Shoe COMPANY

AMSCO

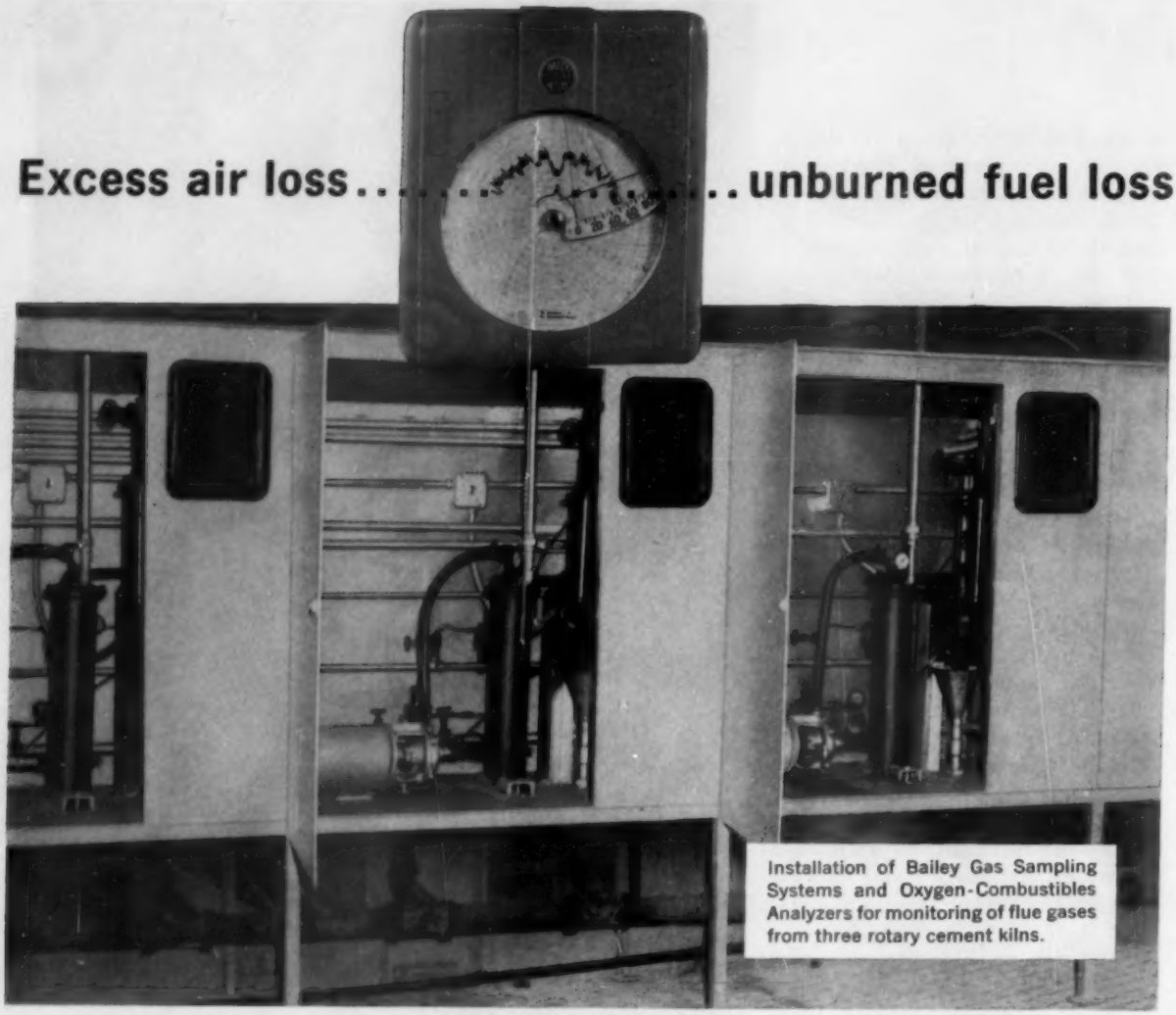
AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILLINOIS

Buy through your local welding supply distributor

Other plants in:
Denver • Los Angeles • New Castle, Del. • Oakland, Calif. • St. Louis
IN CANADA: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed in Canada by Canadian Liquid Air Co., Ltd.

Enter 1442 on Reader Card

Excess air loss.....unburned fuel loss



Installation of Bailey Gas Sampling Systems and Oxygen-Combustibles Analyzers for monitoring of flue gases from three rotary cement kilns.

YOU MUST KNOW BOTH – continuously

...to get best combustion efficiency with a rotary kiln

How much profit is going up the stack every day in unburned fuel? Or are unburned combustibles kept low at the price of heat loss from too much excess air?

Your flue gas tells the story. And the only practical way to know these losses and control them is by continuous analysis of flue gases.

The Bailey Oxygen-Combustibles Analyzer-Recorder performs this monitoring of both unburned fuel and excess air simultaneously and continuously, and records both on a single chart. It permits maximum combustion efficiency to be obtained by maintaining combustion air at the optimum point for each kiln. In addition to effecting savings in fuel costs—more and more important today—accurate control of combustibles helps to prevent ring formations on some kilns. Ask your Bailey engineer, or write, for complete details.

C160-1

CEMENT DIVISION

BAILEY METER COMPANY

1039 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS

Enter 1423 on Reader Card

New Literature

continued from page 139

Extensible paper

Clupak, Inc., is offering a 16-page, pocket-size "facts book" on extensible paper. The booklet tells what extensible paper is, how it is made and how it differs from conventional paper. It contains more than 30 photographs showing typical applications. Also included is information on the extensible paper coated with polyethylene, asphalt or wax, impregnated with wet-strength resins, and bleached or colored.

Enter 708 on Reader Card

Equipment for process industries

Fuller Co. describes its product lines for the chemical processing industries in a 12-page bulletin. The bulletin discusses design and performance characteristics of the pumps, pneumatic conveyors, fluidizing conveyors, rotary compressors and vacuum

pumps, horizontal grate coolers, suspension-type preheaters, positive-displacement blowers and gas pumps, induced-draft fans and industrial exhausters. A separate section describes the company's accessory equipment. Photographs and drawings illustrate design features and some typical installations.

Enter 709 on Reader Card

Hardfacing electrodes & wires

Air Reduction Sales Co., Div. Air Reduction Co., Inc., has issued a 44-page, illustrated catalog on hardfacing electrodes and wires. A cross-referenced, pictorial layout—in which all the hardfacing materials are classified and illustrated according to use—makes it convenient to find information in the booklet.

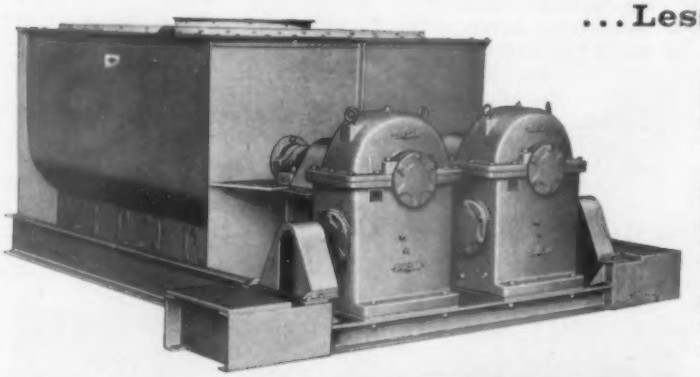
The wear protection provided on industrial and construction equipment by the company's hardfacing alloys is discussed in detail. A description of each electrode is presented along with application data. Over 100 specific equipment parts that benefit from hardfacing are listed, together with the type of wear to which each is subject and the alloy needed to protect it.

Enter 710 on Reader Card

END

EHRSAM DOUBLE-BARREL MIXER

Increases Productivity ...Lessens Costly Downtime



The Ehrsam double-barrel paddle mixer writes its own ticket for economy and increased productivity as a fast, heavy-duty machine for the intensive blending of dry, powdered or granular materials.

Precision engineering and construction cut costly, annoying downtime. Steel plate mixing barrels, adjustable stuffing box seals, heavy-duty roller bearing pillow blocks are only a few of the stress points designed to withstand abusive, day-after-day operation.

Combined with a surge hopper, charging hopper with scales, Ehrsam will program an automatic charging, mixing, and discharge operation to your specifications.

20 TO 120 CUBIC-FOOT MODELS AVAILABLE

The J. B. EHRSAM & SONS MFG. COMPANY

Enterprise, Kansas

DISTRICT OFFICES

Kansas City, Kans. / Denver, Colo. / Chicago, Ill. / San Francisco, Calif. Fort Worth Tex. / Phoenix, Ariz. / Hastings, Neb. / Albuquerque, N. M.

EHRSAM Enterprise, Kansas

Please send new Ehrsam Mixer Catalog 8A. I am also interested in surge hoppers____; screw conveyors____; Dracon____; belt conveyors____; and bucket elevators____

NAME_____

FIRM_____

ADDRESS_____

TOWN_____ STATE_____

E-M/2-661

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NEW 7-FLEX®
makes important savings
on most wire-rope applications

All-new Macwhyte 7-strand rope is flexible as 8-strand—rugged as 6 x 19—fatigue-resistant like 6 x 37. You'll get longer rope life, lower costs. Get Bulletin 60100-R.

349

MACWHYTE
Wire Rope COMPANY

2900 Fourteenth Avenue, Kenosha, Wis.
WIRE ROPE MANUFACTURING SPECIALISTS SINCE 1896
7-FLEX is a registered trademark of Macwhyte Co.
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FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

Enter 1433 on Reader Card

NEW PATENTS

by Oliver S. North

Mica

U. S. 2,993,336—A gas turbine fuel comprises a residual petroleum fuel, and 0.1-1 percent muscovite **mica,** phlogopite mica, **lepidolite** or other micaceous mineral. (to K. J. Mackenzie, E. L. Howe & R. T. Roles; assigned to British Petroleum Co. Ltd.)

British 871,200—A sealing undercoat for application to porous surfaces consists of glue, a pigment, **bentonite** and powdered **mica.** (to M. R. Harborne; 4 pp.)

British 871,411—To increase the dispersibility of **mica** in paints, printing inks, etc., wet-ground mica is admixed with stearic acid or other saturated fatty acid and a solvent, e.g. a mixture of butyl alcohol and xylol. The mixture is aged, and the mica then recovered by filtration and washed and dried. (to H. W. Chatfield; assigned to Micafine Ltd.; 3 pp.)

British 872,231—To facilitate the grinding of **mica, lepidolite, vermiculite** and other micaceous minerals, the mineral is heated at 800-1600 deg. F. for at least 5 min. It may then be ground either wet or dry while still heated. (to R. Leblanc; 5 pp.)

Lime

U. S. 2,994,521—Design for a vertical shaft kiln for terminal calcination and cooling of **lime** emanating from a rotary kiln. A well-burned lime product is obtained. (to V. J. Azbe; assigned to Azbe Corp.)

British 870,649—Design for an improved three-zone shaft furnace for calcining **dolomite** or **magnesite,** producing **lime** from limestone, and similar operations. From the top, the zones are: preheating, calcining and cooling. (to C. F. Priest & N. V. S. Knibbs; 8 pp.)

British 871,463-4—Method and apparatus for manufacturing a retarded ready mixed structural mortar consisting of **lime, portland cement** and **sand.** Zinc oxide or similar metallic oxide is added to retard the set of the wet mortar for 70 hr. or more. (to G. E. P. Jackson & K. H. Renton; 8 pp. in 871,463; 7 pp. in 871,464)

Perlite

U. S. 2,995,087—A lightweight and water-impervious blasting plug for use in quarry or mine drill holes consists of a shaped mixture of cement, mortar and **expanded clay,** expanded **perlite** or other lightweight aggregate. (to R. E. Edney & R. McGee; said McGee assigned to said Edney)

British 871,635—Design for a pneumatic apparatus for effectively filling cavities with expanded **perlite,** exfoliated **vermiculite** or other lightweight insulating materials, wherewith air pockets and open spaces are eliminated. (to R. H. Blattner & F. Blick; assigned to Expanded Perlite Ltd.; 9 pp.)

Phosphate rock

Canadian 623,282—Magnetic process for separating **apatite** and iron values contained in magnetite-apatite ores such as those found in the Province of Ontario, Canada. A low-iron apatite fraction is obtained. (to J. F. Haseman; assigned to International Minerals & Chemical Corp.; 5 pp.)

Asbestos

U. S. 2,993,261—Method of treating fabrics formed predominantly of **asbestos** fiber to make it smoother and white and give it a softer "hand." (to H. E. Sunbury; assigned to U. S. Rubber Co.)

U. S. 2,993,799—A fireproof, water-repellent, lightweight construction material consists of **asbestos** fiber, a thermosetting or thermoplastic polyester resin, a plasticizing resin and a low-cost inert filler material. (to C. L. Blake)

END

ML-309 Moto-Loader makes the dirt fly

Digs and loads up to 300 yards of sand an hour directly from bank to trucks.

Fiorito Brothers, Seattle, Washington, needed 300,000 yards of sand in a hurry for a road job. So they turned to their ML-309 Moto-Loader, with an operating capacity of 9,000 lbs, to do the job. It dug and loaded out trucks at an average of 250 yards an hour—frequently hit as high as 300 yards an hour.

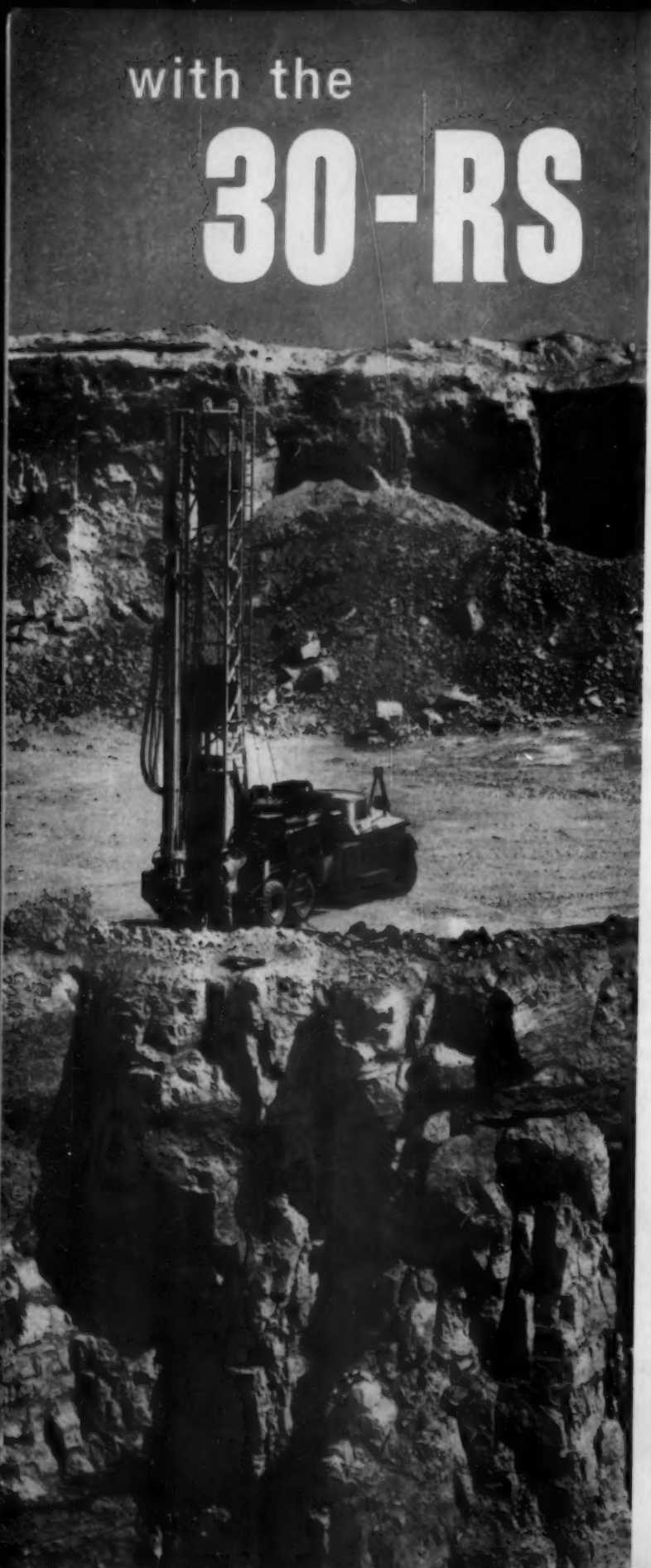
How can a loader of this size turn out production figures like this? Easy, if it is designed and built like an ML-309. Of course, no other loader is, because the "309" has exclusive features that provide performance that sets it apart from other loaders of comparable size.

A demonstration will convince you of how much more a "309" can do: how its job-tested features can put more profit in your pocket with its power, stamina, balance and fast, easy control. Planetary wheel drive keeps torque near the ground where it belongs. Low center of gravity and proper weight distribution eliminate bounce, teeter or wobble. Four-speed, full-power shift, Moto-Matic transmission, plus one-foot control of forward and reverse and acceleration, give cycle times that up production.

Want to know more? Ask your nearby Moto-Loader distributor. He has all the answers. You'll like them.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

Enter 1468 on Reader Card



YOU GET TO THE JOB AND THROUGH THE JOB ...*Fast!*

Getting to the job with the Bucyrus-Erie 30-RS Rotary Drill is a breeze! It folds up and secures for travel in less time than it takes to tell about it. It cruises at normal highway speed, and road visibility is excellent.

Once on the job, though, the difference *really* shows. The mast raises into position hydraulically. Three jacks plant their feet to provide a firm, level foundation. A hydraulic motor exerts any pull-down force you choose, from 0 to 30,000 lb, while another hydraulic drive provides any rotary speed to 110 rpm. With this combination of speed and pressure, you can drill 6¼- to 7⅞-in. holes faster than with any rig in its class — and you can drill continuously for more than 21 ft before adding new pipe.

Finally, the 30-RS lives up to the tradition of rugged stamina that has made the larger Bucyrus-Erie 40-R and 50-R Rotaries the most popular in their fields.

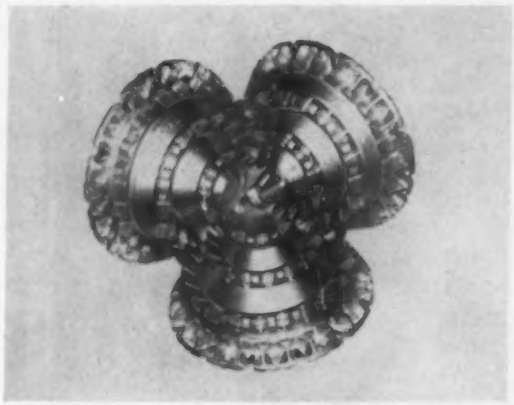
Let your Bucyrus-Erie distributor tell you more about the 30-RS as well as the crawler-mounted 30-RC; or write Bucyrus-Erie Company, Drill Division, South Milwaukee, Wisconsin. 3861

BUCYRUS-ERIE COMPANY

most respected name in the field

NEW MACHINERY

For free information on these ideas, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Rotary bit

A new rotary bit has been developed especially for drilling large holes in hard rock. The 3-cone unit makes 8¾ or 9 in. diam. blastholes with regular or jet and with either air or fluid drilling.

The new bit's cone design incorporates a tooth form more square than the conventional chisel-shaped tooth. As a result, more cross-section is maintained at the end of the tooth during the life of the bit. The new unit has proven that it will give more total footage during its life without sacrificing penetration rate. (Varel Mfg. Co., 9230 Denton Dr., Dallas 20, Texas)

Enter 300 on Reader Card

Transistorized level control

The level of free-flowing, fine solids in deep bins, silos or liquids in tanks may be detected and controlled with Transi-Level. This is a control system combining a transistorized circuit and an electronic frequency control module. Only simple, two-wire leads are needed to connect the probes and the relay control units.

Each probe may be equipped with a wide variety of special heads to suit the varying conditions of handling cement, lime, gypsum, fine limestone or even slurries. The cast aluminum probe unit assembly houses a complete transistorized control module. (The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 36, Mo.)

Enter 301 on Reader Card

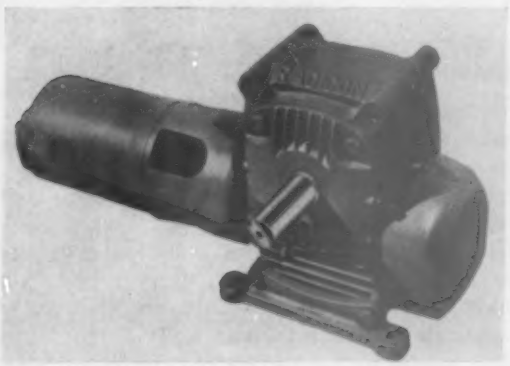
Automatic oiling equipment

This manufacturer's line of processing equipment for the rock products industry may now be equipped with controlled, automatic lubrication. The solenoid-actuated lubricator drip-feeds oil to bearings as long as the machinery is in operation but cuts out automatically when it stops.

The lubricator releases oil from a ½-gal. reservoir by gravity, and each bearing is served by one or more lines through sight-feed valves. (Sturtevant Mill Co., 102 Clayton St., Boston, Mass.)

Enter 302 on Reader Card

Motorized worm gear reducers



Motorized right-angle drives are now offered to give a wide range of high reduction ratios. Integral motors are available to provide up to 20 hp. in a compact unit. With detachable feet, the assembly may be wall mounted, side mounted or ceiling mounted. A finned housing with an integral fan promotes thermal efficiency on each unit.

Output torques for the new Radicon gear motors range from 26 up to 36,400 lb.-in. Reduction ratios range from 5 to 1 up to 372 to 1, and input horsepower from ⅙ through 20 hp. Drive motors offered are standard NEMA flange type in a variety of enclosures to meet the heat, moisture and dust conditions prevailing in the rock products industry. (Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill.)

Enter 303 on Reader Card

Please turn to page 146

New Machinery

continued from page 145

Materials handling pump

Dry pulverized materials can be handled from mills to storage or from storage to shipping bins with a newly developed compact pump. It can handle portland cement, agricultural limestone and other dry, fine materials common in the rock products industry.

Pump and air supply have been integrated into a compact package, and V-velt drives match screw speed and pump capacity. Over-all length of the new unit is less than 84 in., and height to hopper flange is 16 in. Rated capacity is 240 bbl. an hr. conveying portland cement up to 125 ft. (Fuller Co., Catasauqua, Pa.)

Enter 304 on Reader Card

Motion switch

Mechanical motion on belt conveyors and other equipment can be converted into digital voltage pulses with the Rotopulser, a rotary transducer. Two basic designs are offered: zero speed and magnetic types. Each provides any required accuracy and each transfers information over any distance without error or drift.

The zero speed unit rotates a precision ruled disc that interrupts a built-in light source, thus feeding pulses to a controller or readout device.

The magnetic device uses a precision built rotor with individual teeth that represent any desired unit of measurement. As these teeth rotate through a magnetic field, pulses are transmitted to readout or remote control devices. (The Louis Allis Co., 427 E. Stewart St., Milwaukee 1)

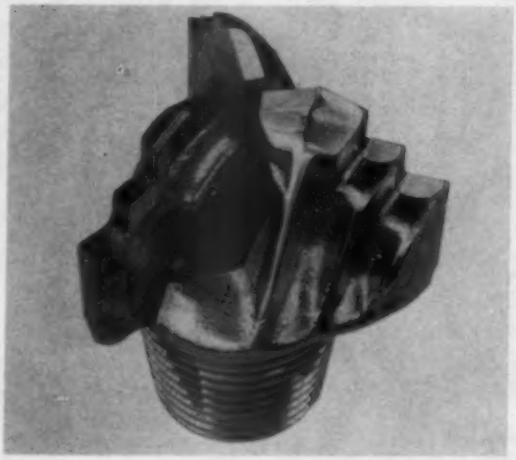
Enter 305 on Reader Card

Shaft-mounted reducer for small horsepowers

This manufacturer has extended his line of shaft-mounted speed reducers into the small horsepower range. Now elevators, feeders and conveyors may be equipped with motor, reducer and V-belts to match the power requirements of the job to be done. The small reducer is designated TDO25 and has the same rugged construction as the larger units in the line. It has the same style of helical gears and pinions supported in antifriction bearings. Maximum horsepower rating is about 1 hp. at maximum recommended output speed of 85 rpm. In combination with a V-belt drive a maximum reduction ratio of 175 to 1 can be achieved. (Dodge Mfg. Corp., Mishawaka, Ind.)

Enter 306 on Reader Card

Throwaway drilling bit



Deflectors designed into the blade face are said to greatly improve this bit's drilling efficiency. These deflectors guide chips away from the center of the bit and into the return circulating flow. Forged right into the blades themselves, these deflectors make the bit particularly effective when drilling in alternating hard and soft strata.

This model of Blue Demon bit is available in 4¼, 4½ and 4¾-in. sizes, and all are to be discarded when completely worn out. (Herb J. Hawthorne Inc., 8801 N. Main, Houston, Texas)

Enter 307 on Reader Card

More efficiency for lime spreaders

A newly designed spinner gear case has greatly improved the efficiency and reliability of lime spreader operation. The new spinner gear transmission is enclosed in a factory-sealed, factory-lubricated case and is guaranteed for one year against failure.

The new design incorporates a hardened steel shaft and tapered spline to eliminate one of the major sources of trouble in conventional spinner drives. With lubricant of the proper grade and amount applied at the factory, maintenance lubrication problems are non-existent. (Highway Equipment Co., 616 D Ave., N.W., Cedar Rapids, Iowa)

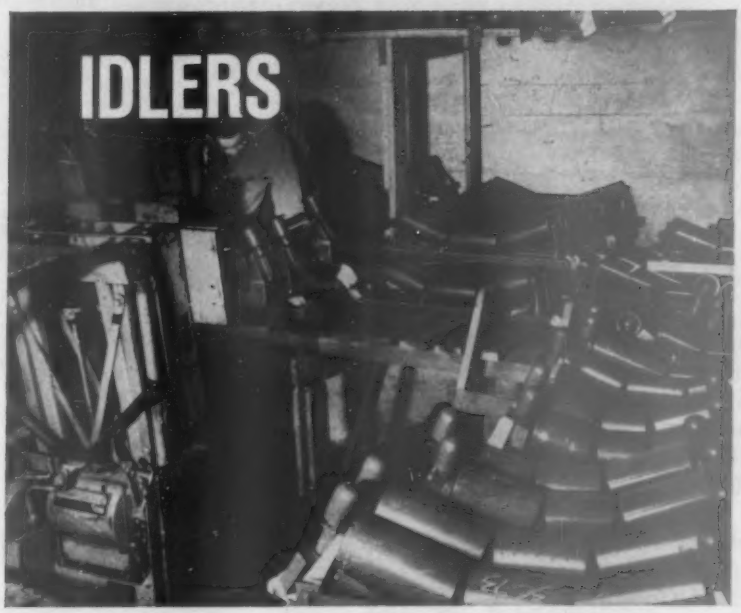
Enter 308 on Reader Card

Please turn to page 148

REPLACE WITH

THE BROAD H-R LINE

fast delivery
technical service
local stock



There is an H-R Distributor in your area...

He is part of a stock-carrying distributor network stretching from Coast-to-Coast, backed by Hewitt-Robins warehouses and sales offices. At his fingertips is one of the widest lines of conveyor belt and idlers available in industry. At his command is technical information that could come only from a company that makes *both* components. Hewitt-Robins stands alone as a manufacturer of conveyor machinery *and* conveyor belting. This fact also assures you of highest quality and single-source responsibility. Hewitt-Robins, Stamford, Connecticut.

Write for bulletins
10-19 (Belt)
10-19 (Idlers)

HEWITT-ROBINS

Conveyor Machinery and Belting • Power Transmission
Hose • Vibrating Equipment • Engineering Services

Enter 1421 on Reader Card

New Machinery

continued from page 146

Grease fitting tool

Zirk-type grease fittings that have become frozen can now be freed with Zirk-Ram, a hydraulic tool. One hammer blow is said to be enough to clear the most stubborn fitting and often its action will reseat damaged fittings. The new tool can exert up to 1,000 lb. of pressure, yet it will not harm the fitting since the pressure is exerted by oil rather than by direct metal to metal contact. (Owatonna Tool Co., 496 Cedar St., Owatonna, Minnesota.)

Enter 309 on Reader Card

Natural troughing conveyors

A new line of rugged, lightweight conveyors provides natural troughing for high-capacity conveying. These self-cleaning units are expandable from 6 to 65 ft. in length with sections that are easily added. Of course, the lengths of conveyor can be changed to accommodate new arrangements of the flow of materials.

The natural troughs are about 2 in. deep. Special conveyor sides prevent material from accumulating under the belt. Standard belt widths are offered from 6 to 24 in. wide. Heavy-duty components include lagged head pulleys, heavy-duty belts and drive machinery. (Finco Inc., Aurora, Illinois)

Enter 310 on Reader Card

Portable load center

For wherever temporary power distribution is needed, a portable 50-amp. center is now available. The 30-lb. unit may be set up or taken down by one man in a matter of minutes. With dimensions of 28 x 10 x 20 in. it may be carried easily in a car or pickup truck.

The compact load center has six 15-amp., 120-v. outlets and one 20-amp., two-pole 240-v. outlet. Distribution centers can be cascaded by means of heavy-duty 4-wire receptacles located on each end of the main bus. Overload and short circuit protection is achieved with quick lag, bolt-in circuit breakers. The unit is built to grounding specifications for permanent installation. (Leonard Electric Mfg. Co., 3907 Perkins Ave., Cleveland 14)

Enter 311 on Reader Card

Mechanical belt splice

Heavy-duty conveyor belts can now be spliced with metal fasteners and then sealed against moisture. In this way the canvass carcass is protected from the deteriorating effects of moisture and fine materials working into the plies.

After the removal of the top and bottom rubber cover, metal splice plates are riveted in place. Rubber filler stock is spread over the clean dry splice, and rubber patches are cold-vulcanized over the entire assembly. The inexpensive process takes only 1½ hr. (Crescent Fastener Co., 381 Fourth Ave., New York 16, N.Y.)

Enter 312 on Reader Card

Noise control

"Scotchfoam" is the name of a vibration damping tape that shows great promise for suppressing noise in rock products producers' plants. The new product consists of a specially processed polyurethane foam on a tough plastic film that is backed with a high-tack adhesive.

When attached to sheet metal, the material will dampen air-borne or structural vibration. It should prove to be ideal for use on pipes, chutes, screen housings, crushers and mills.

The tape is moisture and flame-resistant. In addition, it has good thermal insulation values and excellent resistance to aging. Standard size offered is 6 in. wide by 8 ft. long. (Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.)

Enter 313 on Reader Card

Flexible coupling

First major coupling design improvement in 25 yr. is the claim of the maker of a new flexible coupling. Its flexing member is fabricated from a plastic material.

As a result, the manufacturer states that the new coupling is smaller and lighter than other couplings of the same torque rating, has no backlash and, with no moving parts, is not affected by the abrasive conditions in the rock industry.

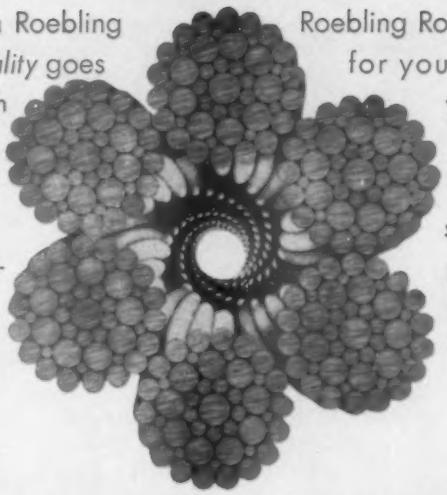
Three types are available: for light, medium and heavy-duty applications. Many units are offered from stock in a wide range of standard bores from ½ to 3½ in. diam. (Lovell Mfg. Co., 1301 French St., Erie, Penn.)

Enter 314 on Reader Card

END

Enter 1439 on Reader Card

Profit from the inside story on Roebling Royal Blue Wire Rope—the *quality* goes all the way through. Extra high strength in conjunction with uniformity of rope construction means unequalled resistance to wear and tear — and a whopping increase in service life. That is why every inch of Roebling Royal Blue pays off on the job for you. Get all the details from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, New Jersey.



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Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation.

Quality inside and outside

We put a lot of work into it — You get a lot of work out of it

MANUFACTURERS NEWS

Offutt elected exec. vp

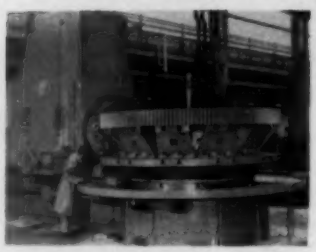
J. James Offutt (photo) has been elected executive vice president of the A. P. Green Fire Brick Co., it was announced by W. S. Lowe, president. Since last September, Mr. Offutt has been vice president and general manager responsible for the functions of sales, research and operations. For the past 33 years, Mr. Offutt has been associated with the company. Mr. Offutt succeeds L. J. Miller, who has recently retired.

Seismograph Contract Div.

A new Contract Div. to supply MD-1 seismograph service to contractors and engineers has been formed by Geophysical Specialties Co., Hopkins, Minn. The new division was set up, according to president Robert Kaasa, in response to the expansion of engineering seismology since introduction by the company of the direct-reading engineering seismograph in 1957.

The service will make available to a wider range of clients the benefits obtainable by seismic exploration. A client may have a complete seismic exploration program planned and carried out by the company staff on a contract basis, or a program may be conducted by the client's personnel through equipment rental.

New gear hobber for Philadelphia Gear Corp.



Philadelphia Gear Corp. announces the installation of a new precision gear hobber (photo) in their recently constructed plant at King of Prussia, Pa. The gear hobber was custom-built for the company by the Liebherr Co. of Kirchdorf, Germany. Suitable for hobbing gears up to 150 in. in diam. and 64 in. in face width, this machine was inspected by technical representatives of the Institute for Machine Tools, Technical University, Munich, Germany, and certified accurate to 10 arc sec. It is now in operating service producing large gears for radar and space equipment and machinery industries.

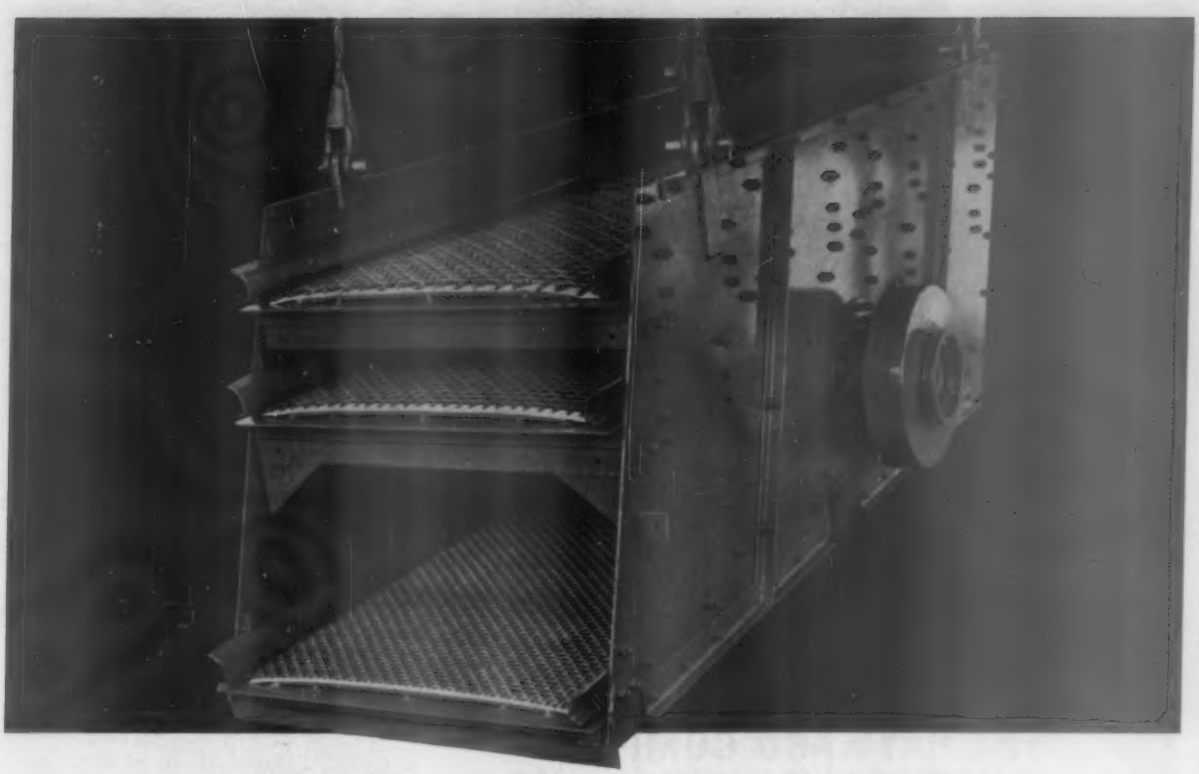
Block appointed director

Norman Block has been appointed director of engineering and research for Western Precipitation Div., Joy Mfg. Co., Los Angeles. Mr. Block was formerly associated with the Foster Wheeler Corp. in New York for 13 years. In his new capacity, he will direct all operations of the engineering and research departments of the division. Western Precipitation produces air pollution control equipment.

Fuller appoints Cole

The appointment of Henry J. Cole as assistant advertising manager of the Fuller Co., Catasauqua, Pa., has been announced. Mr. Cole joined Fuller after five years as advertising manager of Atlas Mineral Products Co., Mertztown, Pa. Prior to that he was sales promotion manager at Everson Electric Co., Allentown.

Please turn to page 152



BIG SHAFT and BIG BEARINGS mean BIG PERFORMANCE with SECO TWIN BEARING SCREENS

If you'll be adding or replacing screens soon . . . look into BIG performing SECO TWIN BEARING SCREENS before you make a decision. We purposely engineered bigger bearings and bigger shafts into every SECO TWIN BEARING to take surge loading without a whimper . . . to stand up to punishing round-the-clock runs . . . and to do it without bogging down and without bearing failure. They're rough, they're tough, they're dependable . . . and that's just because we build them that way. A good many of the SECO TWIN BEARING SCREENS now in use are being successfully used in scalping operations, where users of some other screens wouldn't consider using a 2-bearing screen. As one of our good customers puts it: "Those SECO TWIN BEARINGS are screenin' fools!"

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SCREEN EQUIPMENT CO., INC.

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SECO

PRODUCER PROVEN

VIBRATING SCREENS

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NO SPOT FOR A BREAKDOWN!

KEEP IT GOING AT ITS BEST ...USE ONLY GENUINE HAYWARD REPAIR PARTS!

Hayward Buckets are designed with the most efficient construction features known. And only with genuine Hayward replacement parts can you be sure of maintaining that same high quality. Cheaper "bootleg" parts reduce efficiency, raise operating costs and disrupt schedules.

Anticipate any possible breakdown.
Write today for list of genuine Hayward parts.

THE HAYWARD COMPANY
50 CHURCH STREET, DEP'T R, NEW YORK 7, N. Y.
Builders of Better Buckets Since 1888

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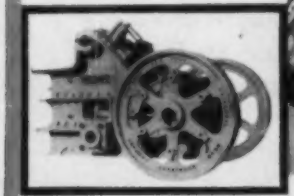
RELIANCE SAND AND GRAVEL PLANTS

Heavy-duty equipment for:
Scrubbing
Washing
Crushing
Classifying



- Lever-type jaw crusher has greater weight, more stability — saves you money on upkeep.
- Minimum abrasion — outlasts other designs 3 and 4 to 1.
- Long jaw plates — adjustable for all fineness ranges.
- Plants of 50 to 1,500 tons-per-day capacity, engineered to your needs. Backed by half century experience.

Booklet on request, pictures installations

UNIVERSAL ROAD MACHINERY CO.
Main office and factory: Kingston, N. Y.
New York City office: 117 Liberty St.

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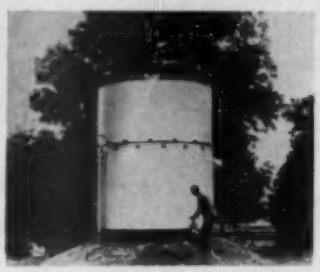
Manufacturers News

continued from page 150



Sewage treatment system

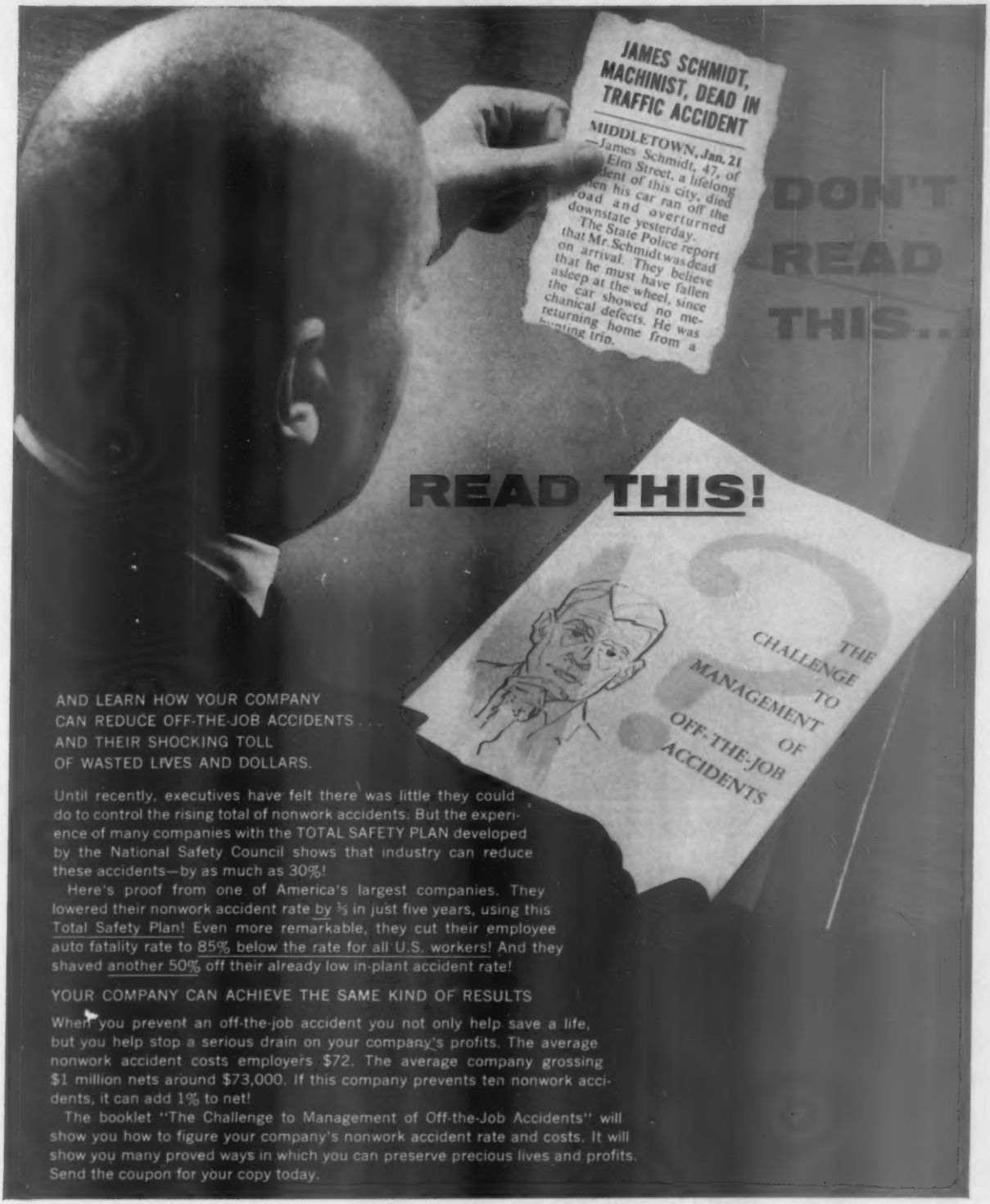
Link-Belt Co., Chicago, Ill., presents its new single-unit sewage treatment system in a 16-mm., color film that shows how a compact plant can give big city sewage processing to areas that lack municipal facilities. The treatment plants are available in capacities to serve 50 to 500 people and the film underscores application in new suburban areas with small capacity needs. The film illustrates the operation of a unit in relation to the process employed in a large municipal bio-filtration plant. Individual components are shown in relation to the function they perform in treating raw sewage.

Neben joins WEMCO

Mr. P. H. Mulcahy, general manager of WEMCO, a division of Western Machinery Co., San Francisco, Calif., announced the appointment of Ernest W. Neben to an executive management position. WEMCO manufactures a line of processing equipment for both the mineral and aggregate industries.

Mr. Neben brings to his new assignment a background of twenty years engineering and sales experience in the processing equipment field. He is a member of the American Society of Mechanical Engineers, National Society of Professional Engineers and American Institute of Chemical Engineers.

Please turn to page 154



AND LEARN HOW YOUR COMPANY
CAN REDUCE OFF-THE-JOB ACCIDENTS . . .
AND THEIR SHOCKING TOLL
OF WASTED LIVES AND DOLLARS.

Until recently, executives have felt there was little they could do to control the rising total of nonwork accidents. But the experience of many companies with the TOTAL SAFETY PLAN developed by the National Safety Council shows that industry can reduce these accidents—by as much as 30%!

Here's proof from one of America's largest companies. They lowered their nonwork accident rate by ⅓ in just five years, using this Total Safety Plan! Even more remarkable, they cut their employee auto fatality rate to 85% below the rate for all U.S. workers! And they shaved another 50% off their already low in-plant accident rate!

YOUR COMPANY CAN ACHIEVE THE SAME KIND OF RESULTS

When you prevent an off-the-job accident you not only help save a life, but you help stop a serious drain on your company's profits. The average nonwork accident costs employers $72. The average company grossing $1 million nets around $73,000. If this company prevents ten nonwork accidents, it can add 1% to net!

The booklet "The Challenge to Management of Off-the-Job Accidents" will show you how to figure your company's nonwork accident rate and costs. It will show you many proved ways in which you can preserve precious lives and profits. Send the coupon for your copy today.

Published to save lives in cooperation with The Advertising Council and the National Safety Council

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CHICAGO 11, ILLINOIS

Please send a copy of "The Challenge to Management of Off-the-Job Accidents." I want to learn how my company can save lives and dollars with your TOTAL SAFETY PLAN.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

continued from page 152

Spencer expands

Nitro-carbo-nitrate, a component in blasting materials, will be manufactured in a plant now being constructed by Spencer Chemical Co., Carlsbad, New Mexico. Announcement of the new product and plant represents both an expansion of the company's activities in the mining industry and an upgrading of its product line now used. The new plant will perform the operation of mixing ammonium nitrate with carbonaceous material and will package the mixture in 50-lb. bags. In use, the material will be poured or pneumatically placed in blast holes and detonated by a primary explosive.

Correct welding procedures

A 16-mm. color-and-sound motion picture entitled "How to Weld 'T-1' Steel," is now available from U. S. Steel Corp., Pittsburgh, Pa. Produced especially for training purposes, the 18-min. motion picture will aid shop and field welding crews, welding trainees and vocational and engineering school students. The film shows how to insure sound welds in structures and equipment fabricated from steel. The importance of correct electrodes, welding heat and procedure is explained and illustrated.

A booklet is presented to everyone who sees the film. Included with each booklet is a welding heat input calculator.

Central parts division for J. I. Case Co.

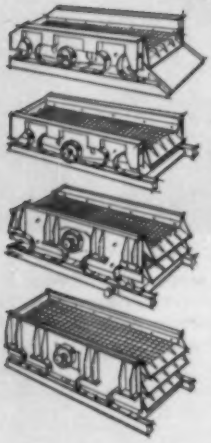
Wm. J. Grede, president of the J. I. Case Co., Racine, Wis., announced the formation of a central parts division. Case manufactures agricultural tractors and implements as well as industrial, construction, and materials handling tractors and equipment. Mr. D. A. Beckenbaugh, vice president, sales and manufacturing administration, has been given the responsibility of the direction of the new division.

These two 10'x60" double-deck KOLMAN Screens operating in tandem are key units in a portable aggregate plant making specification materials for highway construction.

Step up Screening Profits with

KOLMAN

VIBRATING SCREENS



MAXIMUM CAPACITY
High speed operation delivers effective screening power and produces clear, accurate separations.

LIGHT AND COMPACT
Packs terrific screening capacity into a minimum of space without excess weight.

RUGGED CONSTRUCTION
Proved to take the abuse dished out by the toughest jobs.

FLOATING ACTION
Unique spring suspension system gives the freedom of movement required for added capacity without transmitting vibrations to the frame.

WRITE FOR BULLETIN 140

KOLMAN MANUFACTURING CO.
4200 West Twelfth Street SIOUX FALLS, S. DAK.

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Challenge-Cook completes move to modern plant

J. E. Hall, president, Challenge-Cook Bros., Inc., Los Angeles, has announced the removal of the company's truck mixer manufacturing facilities to a larger, modern plant. The new plant is located in La Mirada, Calif., and has more than 210,000-sq. ft. of manufacturing space under roof. The truck mixers manufactured in Los Angeles are distributed throughout the 11 Western States, Alaska, Western Canada and Hawaii. The Bryan, Ohio plant serves the Eastern and Central United States and Eastern Canada.

Van Houten elected vice president

Herman Van Houten has been elected vice president and general manager of the Mining and Construction Div. of Joy Mfg. Co. For the past two years Mr. Van Houten has been assistant to the president, in which capacity his responsibilities included liaison with Joy's overseas operations. In his position as vice president and general manager, Mr. Van Houten will be responsible for the administration of all sales, service, engineering and manufacturing in his division.

New hydraulic division

Creation of a new hydraulic division has been announced by E. F. Fisher, president, Gar Wood Industries, Inc., Wayne, Mich. The division will manufacture and market a complete line of hydraulic pumps, valves and other components. Gar Wood invented the hydraulic dump truck in 1912. Key product in this new line is a variable-volume, piston-type pump recently introduced. This pump is now undergoing field testing.

END

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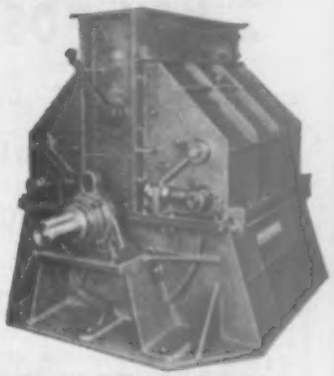
Large Quarry Operators!

Turn your stock pile inventories into a PROFIT

Make uniform commercial size limestone aggregates for greater compaction to meet sub-base specifications in highway construction and ½ inch and smaller aggregates including Ag-stone for farm use, —from your waste sizes and slow moving stock pile sizes.



"Established in 1885"

Dependable Large Capacity Heavy Duty CENTER FEED IMPACT HAMMER CRUSHER

A high tonnage producer, embodies tremendous strength for a life time of economical service. The patented deflector bar directs the material to the hammers. The hammer rotor can be operated in either direction for reversible duty with minimum of down time. The baffle bars and hinged breaker plates are adjustable. Tramp metal catchers and automatically controlled feeders are optional. Our illustrated bulletin mailed on request (no obligation).

GRUENDLER

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NO OTHER PUMP CLAIMS BETTER PRODUCTION THAN "TELLTALE"

NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Reports of much greater "Telltale" production than pumps of the same size replaced at same spots and under same conditions are common. Reports of substantially greater production than replaced pumps of larger size are not rare.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pump to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

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2 KEY POSITIONS

Created by Expansion of Cement and Pyro-Processing Division

Engineers presently occupying responsible positions and possessing a proven record of achievement, are invited to examine the opportunities listed below. Preferred qualifications include practical experience in plant design, operation and maintenance; and familiarity with the latest developments in the cement industry. Know-how in related fields such as light weight aggregates, lime, etc. or knowledge of foreign languages is desirable.

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Preferably PE and AIEE member, fully familiar with latest developments in cement plant installations, controls and automation, including radiation absorption-type instruments, sonic and master-slave mill feed controls, X-ray analysers, TV systems and computer applications. He will be fully responsible for all phases of planning and engineering. Participation in the activities of the AIEE Cement Committee is expected.

CHIEF DESIGN ENGINEER

Requires extensive background in overall plant design, including field and operating experience. He will be in charge of one or several groups composed of design engineers, designers and draftsmen.

Opportunities are also available for:

SENIOR DESIGNERS AND DESIGN ENGINEERS

Extensive experience in cement plant design required, preferably backed by field and operating experience.

● All assignments will be in our modern, New York headquarters, near Grand Central Station, and will afford excellent, stable opportunities for professional development and advancement. Progressive insurance, pension plans, and other employee benefits. Your inquiry is invited and will be held strictly confidental.

Please write stating details of background and salary requirements to R. L. Stacom, Manager of Technical Employment

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PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from 1/4" to 1 1/2" thickness. *Write for Catalog Sheet.*

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"Ready Mixed Concrete," is an historical, authoritative account of one of the fastest growing industries in the world.

Written especially for people in the Ready Mixed Concrete Industry the book is a harvest of factual information on every fundamental phase of the business.

Give a copy to every employee who has a hand in YOUR reputation for quality mixes, and in YOUR profits. Order your copies today.

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Enclosed is my check (money order) for $.....Please send at once ..... copies to:

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You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o ROCK PRODUCTS, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

CLASSIFIERS: Akins and Wemco 60" x 27'9". Akins and Wemco 78" x 26'9" with motors and drive. Wemco 36" x 19'3". All new 1958.

COMPRESSOR: Chicago Pneumatic 26 x 15 x 18, OCE, 400 H.P., 2300 volt, complete. Two Ingersoll Rand XVHE2, capacity 2790 CFM @ 100 lbs., 500 H.P., 2300 volts.

DRAGSCRAPER: Sauerman Unit complete with 2 yd. Crescent Bucket.

WAGON DRILL: Ingersoll Rand with tug along motor, 200 ft. drill steel.

CLAM SHELL BUCKET: Williams 1¼ yd.

SCREEN: Allis Chalmers 4' x 12', horizontal, 3 deck, with motor.

LOG WASHER: 8' x 25' with new paddles, 50 H.P. motor. Excellent condition.

CRUSHERS, JAW: Allis Chalmers 40 x 42" with 150 H.P. V-belt drive motor and controls, with or without heavy duty Apron Feeder 42" x 14'3" with motor, reducer and drive, condition guaranteed. Buchanan 30 x 42" with motor and drive. Traylor 24 x 36" and 15 x 24". Allis Chalmers 18 x 30". Other crushers 8" x 10" to 48" x 60".

CRUSHERS, ROLL: One Sturtevant 16" dia., 4" face. One 14" x 52".

MINE HOIST: One 10' x 10', double clutched drums, 1250 H.P., 1½" rope, 38,000 lbs. line pull.

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10' x 11' x 175' Vulcan Kiln, $\frac{11}{16}$"
10' x 100' dryers, ⅜" shell
10' x 78' National dryers, ⅜"
8'-6" x 70' Bartlett & Snow dryers
8' x 80' Traylor dryer, ⅝" welded.
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8' x 60' Davenport, $\frac{7}{16}$" welded
8' x 40' Stearns-Roger dryers, ½"
7'-6" x 62' kiln, ½" welded
7' x 120' Allis kiln, ⅝" welded
7' x 110' Bonnot kilns, ⅜" shell.
6' x 7' x 100' kiln, ½" shell
6' x 150' kiln, ⅜" welded
6' x 50' Louisville steam-tube
6' x 50' rot. dryer, ⅜".
6' x 40' rot. cooler, ⅜"
6' x 23' dryer, ⅜" welded.
3' x 23' Standard dryer, ⅛"

JUST PURCHASED
1—6' x 150' kiln, ⅝"
1—Allis 6' x 12' rod mill
1—Raymond 66" hi-side mill

PERRY

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BALL & ROD MILLS

Hardinge 8' x 48" conical pebble, 75 HP
Hardinge 7' x 36" conical pebble
Allis-Chalmers 6' x 18' pebble-tube
Allis-Chalmers 6' x 16' ball-tube
Allis-Chalmers 6' x 12' rod, 125 HP.
Allis-Chalmers 5' x 22' ball-tube
Bonnot 5' x 10' ball-rod mill 75 HP.

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Symons 2' standard cone crusher
Symons 2' shorthead cone crusher
Farrel 36" x 15" jaw crusher
Buchanan 24" x 13" jaw, 50 HP
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Raymond #6639 hi-side mill, 250 HP.
Raymond 66" 6-roller hi-side mill.
Raymond 50", 5-roller, hi-side mill
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Wheeling Jaw Crusher 6 x 12
Farrel Jaw Crusher 24 x 13B
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Good Roads Jaw Crusher 5 x 12
Good Roads Jaw Crusher 10 x 30 R.B.
New England Jaw Crusher 14 x 28
Cedar Rapids Jaw Crusher 9 x 24
Sturtevant #1 & 1½ Rotary Crushers
Syntron Feeder F33 (New)
New Holland Plate Feeder 24" x 60"
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SX13 Penna. Hammermills, 400 HP
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14"	4	28 oz.	1/8" x 1/32"	3.13
16"	4	28 oz.	1/8" x 1/32"	3.28
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18"	25'	959	102.42
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24"	25'	1067	116.24
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INDEX TO WHERE TO BUY

Business Opportunities 161, 162
Consulting Engineers and Services 162
Equipment Wanted 162
Wanted Help—Positions 162

Aggregate Equip. & Sply Co. 161
Ashmus, E. L., Belting Co. 161

Bacon-Pietsch Co., Inc. 159
Bonded Scale and Machine Co. 159
Brill Equipment Company 158

Clyde Equipment Co. 160
Corson, G. & W. H., Inc. 159
Cruz, R. 162

Darien Corporation 162
Dunn, James R., and Associates 162

Euclid Div., GMC, Iron Range Branch 160
Euclid-Tennessee, Inc. 159
Evans, J. D., Equipment Co. 161

First Machinery Corp. 157
Fogleman, Julius M. 161
Frank, M. K. 160

Gelb, R., & Sons, Inc. 162

Haigler's Limestone 162
Hain, Leo L., Inc. 161
Heat & Power Co., Inc. 157
Heidenreich, E. Lee, Jr. 162

Kerford, Geo. W., Quarry Co. 158

Loofbourow, R. L. 162
Lubrecht, William III 160, 161

Mid-Continent Equipment Co., Inc. 158

New Ulm Quartzite Quarries, Inc. 162
Newswanger, J. S. 158
Nussbaum Electric Co. 161

O'Neill, A. J. 157

Paltech Co. 161
Perry Equipment Corp. 157

Rand, John R., Inc. 162
Robinson, J. H. & Associates Ltd. 162

Smith, L. B., Inc. 158
Snow, N. J., Equipment Co. 160
South River Sand Co. 160
Stanhope, R. C., Inc. 161
Swabb, Frank, Equipment Co., Inc. 161

Terteling, J. A., & Sons, Inc. 160
Thomasville Drilling & Testing Co., Inc. ..162
Tractor & Equipment Co. 161
Troyer, Stanley B., Equipment Co. 158

Unverzagt, G. A. & Sons, Inc. 157

Whisler Equipment Co. 158

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INDEX TO DISPLAY ADVERTISERS

Allis-Chalmers 49, 65, 98, 99
American Clay Machinery Div.
Huber-Warco Co. 135
American Manganese Steel Div.
American Brake Shoe Co. 139
Armco Drainage & Metal Products 129
Armco Steel Corporation
Sheffield Div. 70
Armstrong-Bray & Co. 156

Bailey Meter Co. 140
Barber-Greene Co. 44, 45
Smith Engineering Works Div. 16, 17
Bath Iron Works Corp.
Pennsylvania Crusher Div. 31
Bemis Bro. Bag Co. 137
Bucyrus-Erie Co. 121, 144

Canadian Refractories Ltd. 47
Case, J. I., Co. 26, 27
Caterpillar Tractor
Co. 43, 54, 55, 62, 63, 66
Chain Belt Co. ....Inside Back Cover
Chicago Pneumatic Tool
Company 130, 138
Chrysler Corp.
Dodge Truck Div. 104, 105
Clark Equipment Company
Construction Machinery Div. .22, 23
Coates Steel Products Co. 28
Corhart Refractories Co.
Subsidiary of Corning Glass
Works 4
Colorado Fuel & Iron Corp.
Roebling's, John A., Sons Corp.,
Div. 149
Columbia Steel Casting Co., Inc. ..128
Combustion Engineering, Inc.
Raymond Div. 53

Denver Equipment Co. 25
Diamond Iron Works Div.
Goodman Mfg. Co. 10, 11
Dodge Mfg. Corp. 73
Dodge Truck Div.
Chrysler Corp. 104, 105
DuPont, E. I., de Nemours & Co.,
Inc. 123

Eagle Iron Works 51
Eaton Mfg. Co.
Fuller Transmission Div. 72
Ehrsam, J. B., & Sons Mfg. Co. ..141
Eriez Manufacturing Co. 71

Federal-Mogul Service Div.
Federal-Mogul-Bower Bearings,
Inc. 111
Frog, Switch & Mfg. Co. 142
Fuller Co.
Subsidiary of General American
Transportation Corp. 67
Traylor Engineering & Mfg. Div. 7
Fuller Transmission Div.
Eaton Mfg. Co. 72

Gardner-Denver Co. 8, 9
General Refractories Co. 39
Goodman Mfg. Co.
Diamond Iron Works Div. ...10, 11
Goodrich, B. F., Co. 1, 74, 75
Goodyear Tire & Rubber Co. 15
Green, A. P., Fire Brick Co. 107
Gruendler Crusher & Pulverizer
Co. 155

Hardinge Co., Inc. 46
Harnischfeger Corp.
P & H Construction & Mining
Div. 3
Hayward Company 152
Hewitt-Robins 147
Hough, Frank G., Co. ...32, 33, 34, 35
Huber-Warco Company
American Clay Machinery Div. .135

Iowa Mfg. Co. 68, 69

Joy Manufacturing Co.
Western Precipitation
Div. .....Inside Front Cover

KW-Dart Truck Co. 37
Kaiser Aluminum & Chemical
Sales, Inc. .....Back Cover
Kaiser Engineers
Div. Henry J. Kaiser Co. 115
Kellogg, M. W., Co. 156
Kennedy Van Saun Mfg. & Eng.
Corp. 103
Kolman Mfg. Co. 154

LeRoi Div.
Westinghouse Air Brake Co. ..113
Link-Belt Co. 77

Macwhyte Wire Rope Co. 142
Mine & Smelter Supply Co. 52
Minneapolis-Honeywell 18, 19
Mission Manufacturing Co. 125
Murphy Diesel Co. 60

Nordberg Mfg. Co. 57, 59
Northwest Engineering Co. 5

Overstrom & Sons, Inc. 78
Owen Bucket Co. 61

P & H Construction & Mining Div.
Harnischfeger Corp. 3
Pekor Iron Works, Inc. 155
Pennsylvania Crusher Div.
Bath Iron Works Corp. 31

Raymond Div.
Combustion Engineering, Inc. .. 53
Roebling's, John A., Sons Division
Colorado Fuel & Iron Corp. 149

Sauerman Bros., Inc. 56
Screen Equipment Co., Inc. 151
Sly, W. W., Mfg. Co. 64
Smidth, F. L., & Co. 12
Smith Engineering Works Div.
Barber-Greene Co. 16, 17
Southwestern Engineering Co. ... 21
Spencer Chemical Co. 40, 41
Standard Metal Mfg. Co. 48
Sturtevant Mill Co. 136
Syntron Company 6

Thew Shovel Company 58, 143
Traylor Engineering & Mfg. Div.
Fuller Co. 7
Twin City Iron & Wire Co. 156

Universal Road Machinery Co. ...152

Werco Steel Corp. 133
Western Gear Corp. 79
Western Machinery Co. 127
Western Precipitation
Div. Joy Mfg. Co. Inside Front Cover
Westinghouse Air Brake Co.
LeRoi Division 113
Wilfley, A. R., & Sons, Inc. 128
Williams Patent Crusher &
Pulverizer Co. 118

Yale & Towne Mfg. Co.
Trojan Div. 117

NOTES FROM THE PUBLISHER

October, 1961

Dear Reader:

At ROCK PRODUCTS we have just completed our "Production Estimates" for 1962. The outlook is most encouraging.

However, I do wonder how much more encouraging the outlook would be if every one of us sold our respective products to the hilt.

The last few months I have had the opportunity to call on a number of average-sized producers and have asked them where their products are headed once they are sold. The surprising thing to me was that few of the producers really knew—or what's more cared—what was the final use for their product.

Wouldn't it be much smarter if we all knew exactly what channels of distribution our raw materials followed? Wouldn't this provide a grand opportunity to do some promotion of our quality product aimed at the final consumer?

Well back in my college days, my Economics professor kept referring to the law of supply and demand and the "over-production" of given products.

It seems to me there never has been over-production of any given product. What has plagued us is under-consumption, which can be corrected by better promotion and harder selling.

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Sincerely,

Philip D. Allen

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Publisher

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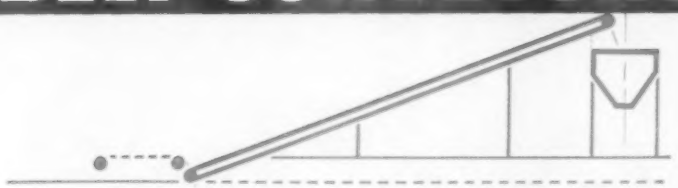

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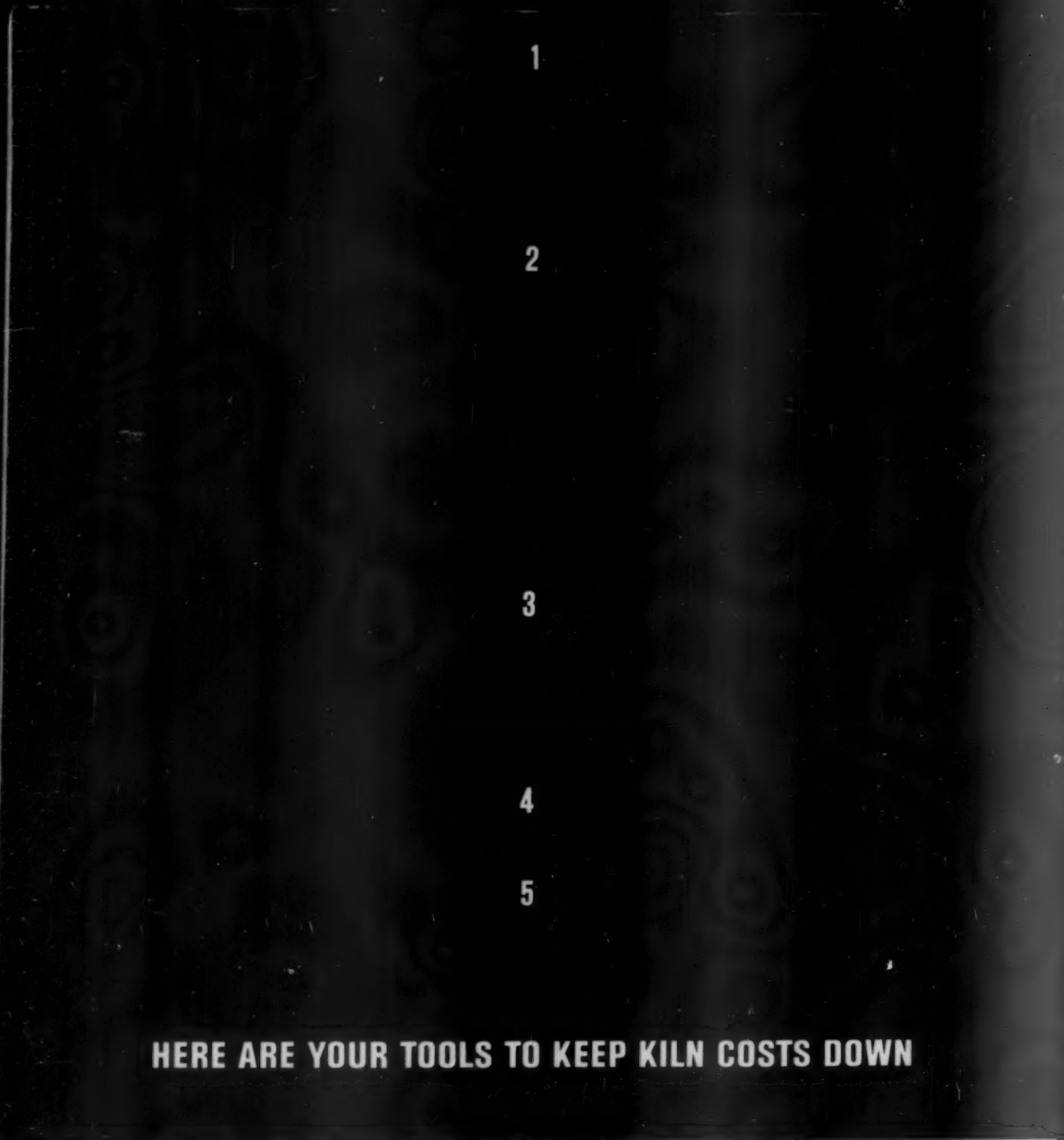

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